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A

BRIEF REVIEW

OF THE

MEANS OF PRESERVING THE HEALTH

OF

EUROPEAN SOLDIERS IN INDIA.

PART THE FOURTH.

BY

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BENGAL MEDICAL SERVICE.

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Measurements of Permanent European Barracks in the Bengal Presidency.

Regiments.	Stations.	Wards.	Length.	Breadth.	Height.	Cubic Contents.	Number accommodated on the night of the 14th November, 1859.	Number of persons that the ward is intended to accommodate.	Average cubic space for the present occupants.	Average cubic space for the persons that the ward is intended to accommodate.	Superficial space for the present occupants.	Superficial space for the persons that the ward is intended to accommodate.	Aspect.	Division.	Means of Ventilation.
H. M.'s 7th D. Guards.	Sealkote ...	No. 1, Married Bk. 12 Main Wds. each mg.	12	16	20	46080	29	12 men and families.	2780	3360	139	168	North and North West.	Sealkote.	Ridge ventilators.
		No. 1, Married Bk. 12 Small Wds. each mg.	12	12	20	34560									
		No. 2, Married Bk. 12 Main Wds. each mg.	12	16	20	46080	35	12 men and families.	2304	3360	115	168			
		No. 2, Married Bk. 12 Small Wds. each mg.	12	12	20	34560									
H. M.'s 2nd D. Guards.	Lucknow.	9 Wards, ea. ward contains 4 compartments each.	52	22	23	26312	15 (26th March 1860.)	18	1754	1461	76	63	E. & W.	Lucknow.	By doors and windows.

Measurements of Temporary European Barracks in the Bengal Presidency.

Regiments.	Stations.	Wards.	Length.	Breadth.	Height.	Cubic Contents.	Number accommodated on the night of the	Number of persons that the ward is intended to accommodate.	Average cubic space for the present occupants.	Average cubic space for the persons that the ward is intended to accommodate.	Superficial space for the present occupants.	Superficial space for the persons that the ward is intended to accommodate.	Aspect.	Division.	Means of Ventilation.
H. M.'s 38th Regt.	Roy Bareilly.	57 Huts each.	42	18	24	18144 ea.	14 each,	14 each.	1296	1296	54	54	E. & W.	Lucknow.	By doors.
Head Quarters Her Majesty's 5th Fusiliers and Detachment East India Regiment.	Raneegunge.	No. 1, Iron Barrack. — No. 1 Bk.	319	39·6	18	226809	None.	140	.....	1905	.....	90	N. W.	Barrackpore.	By doorways.
		No. 1, Iron Barrack. — No. 2 „	319	39·6	18	226809	„	140	.....	1905	.....	90			
		No. 1, Iron Barrack. — No. 3 „	319	39·6	18	226809	„	140	.....	1905	.....	90			
		No. 1, Iron Barrack. — No. 4 „	319	39·6	18	226809	25	140	9072	1905	504	90			
		No. 1, Iron Barrack. — No. 5 „	319	39·6	18	226809	13	140	17446	1905	969	90			
		No. 1, Iron Barrack. — No. 6 „	319	39·6	18	226809	93	140	2438	1905	135	90			
		No. 1, Iron Barrack. — No. 7 „	319	39·6	18	226809	164	140	1383	1905	76	90			
		No. 1, Iron Barrack. — No. 8 „	319	39·6	18	226809	None.	140	.....	1905	.....	90			
		No. 1, North Barrack. — No. 1 Bk.	97	17	12	19788	„	20	.....	989	.....	82	E. & W.		
		No. 1, North Barrack. — No. 2 „	97	17	12	19788	16	20	1236	989	103	82			
		No. 1, North Barrack. — No. 3 „	97	17	12	19788	33	20	599	989	49	82			
		No. 1, North Barrack. — No. 4 „	97	17	12	19788	8	20	2473	989	206	82			
		No. 1, North Barrack. — No. 5 „	97	17	12	19788	6	20	3298	989	274	82			
		No. 1, North Barrack. — No. 6 „	97	17	12	19788	20	20	989	989	82	82			
		No. 1, North Barrack. — No. 7 „	97	17	12	19788	20	20	989	989	82	82			
		No. 1, North Barrack. — No. 8 „	97	17	12	19788	20	20	989	989	82	82			
		No. 1, North Barrack. — No. 9 „	97	17	12	19788	15	20	1319	989	110	82			
		No. 1, North Barrack. — No. 10 „	97	17	12	19788	21	20	942	989	78	82			
		No. 1, South Barrack. — No. 1 Bk.	236	36	17	144432	None.	120	.....	1203	.....	70	N. W.		
		No. 1, South Barrack. — No. 2 „	236	36	17	144432	„	120	.....	1203	.....	70			

11th April 1860.

Note on the Internal Admeasurement of European Barracks in the Bengal Presidency

The annexed Table embodies the Returns of the Admeasurement of a few Permanent and Temporary Barracks which have been received since the publication of the preceding Chapter. These Returns, for Bengal, are now, for the first time, available in a nearly complete form.

We must again observe that it is to be regretted that the permanent value of these tables is considerably lessened by the fact that a large proportion of our European Force were lodged, when the Returns were called for, in temporary quarters. I, however, earnestly trust that, when the whole of our Force shall have been provided with Permanent Barracks, fresh Returns may be called for and may be published by Government.*

With the tabulated data so clearly before him, it is unnecessary that the reader should be furnished with a minute analysis of their results. On glancing down the columns which

* The Printing of these Tabular Returns, in Number XII of the Indian Annals of Medical Science, proved so extremely costly, that no ordinary private means could again undertake to meet such an outlay.

show the average number of cubic feet of space opportioned to each inmate of the Permanent Barracks at the time when the returns were furnished, it will be observed that, generally, each man had considerably more than 1000 cubic feet. In a very considerable number of instances, even the highest average allowed in the Standard Plan (2952) was exceeded; and, in some instances, where small parties of soldiers and families occupied buildings intended to accommodate much larger bodies,—each individual enjoyed a breathing space of from four to sixteen thousand cubic feet and upwards.

In a few Permanent Barracks, the space allowed was less than 800 cubic feet. Thus, at Dugshaie, the space was from 714 to 810. The Provisional Battalion, at Dum Dum, had only 675 cubic feet per man. The Barracks of the Artillery Division, Umballa, afforded 643. The inhabitants of the Married Barracks, at Kussowlie, had but 445; and six persons, lodged in a bungalow at Cawnpore, had the lowest standard that the tables present, viz. 443 cubic feet per man;—doubtless, however, with thorough perflation from every side of the building.

It is almost needless to say that the great practical utility of such Tables as these is that,—immediately upon receipt of a report of unusual sickness in any body of men of known strength,—the authorities are enabled to ascertain, at a glance, whether overcrowding is at the root of the evil;—and, with these particulars before them, Government and the higher Military and Administrative Medical Authorities can distribute our forces with a degree of safety and accuracy never attainable while the only guiding data were that, at certain stations, there are spacious barracks for Regiments, and that, at certain others, there are quarters capable of accommodating a Wing or a Company of Artillery.

Since the publication of the last chapter, on Barracks, early in April 1860, the New Medical Regulations, for H. M. British Army, have reached India. In these, the best recommendations of Mr. Sydney Herbert's Sanitary Commission have become a portion of the Regulations of the Department..

It is here directed that "Before any new Barrack or Hospital is erected, the Plans and Site will be submitted for approval, in so far as regards the healthiness of the buildings, to the Director General.

That "The minimum space to be allowed for men in Permanent Barracks, in temperate climates, is 600 cubic feet.

The number of men which each Barrack Room is capable of containing, in accordance with this measurement, is to be painted on the door; and the numbers, so notified, shall not be increased without the sanction of the Secretary of State.*

"In all new Barracks, in temperate climates, the amount of space will be 600 cubic feet per man, and it is to be raised to the same amount in all existing Barracks, as soon as the accommodation can be sufficiently extended. In all Barracks partly occupied, the men are to be distributed, so as to give, as nearly as possible, 600 cubic feet per man."

In order to carry out the general sanitary rules for Barracks, &c., laid down in these Regulations, it is directed that "The Surgeon or Medical Officer in charge shall visit all Barracks, Quarters, Guard Rooms, Hospitals, Cells, and Married Soldiers' Quarters at frequent intervals, to examine their general sanitary condition and cleanliness. He shall note the state of cleanliness of the rooms and beds, the state of the atmosphere by day, and when the men are in quarters. He shall examine and make enquiry, at such times as he may consider necessary, into the condition of the Latrines, Drainage, Urinals, Water Supply, Stables, General Cleanliness, &c., so as to enable him to judge of the sanitary condition of the whole buildings. He shall keep notes of all such examinations, stating whether the results were satisfactory, the defects he discovered, the representations he made, verbally or in writing, to his Commanding Officer, to have them removed, and the result.

"The Surgeon or Medical Officer in charge shall transmit to the Principal Medical Officer in Garrisons, Camps, and Stations, and to the Sanitary Officer, when an Army is in the Field, copies of all written recommendations he may have considered it necessary to make for protecting the health of troops; and, except when an Army is in the field, he shall, immediately, send copies of such recommendations stating the results to the Director General.

The Commanding Officer of any Garrison, Camp, Station, Regiment, or Detachment, immediately on receiving any verbal or written representation or recommendation from the Principal Medical Officer, or from the Surgeon or Medical Officer in charge, on any matter influencing the health of the Troops, will take the same into his careful consideration, and

* It appears, from his Memoirs, that this excellent plan was first recommended by Sir Charles J. Napier, for Barracks in India.

give the necessary instructions for remedying the defects represented, unless he has sufficient reasons for not doing so, in which case, and if the representation has been made in writing, the Commanding Officer will state such reasons in writing, and transmit the same, forthwith, together with the representation or recommendation of the Medical Officer, to the Commander-in-Chief."†

The Provision of Proper Hospitals.

What must we think of the destruction of mankind, under pretence of succour and maintenance, by a national charity under the Royal patronage.—*Regulations in France for the Common Good.*—Gentleman's Magazine.—1763.

Since the publication of the earlier chapters of this article, the whole question of Hospital Sanitation, and of those Diseases which are generated in ill placed, faultily constructed, badly cleansed and ventilated, and overcrowded Hospitals, has been largely reviewed in our medical literature; and the consequence has been the establishment of certain definite principles,—not previously unknown, but never generally accepted and acted upon,—the universal recognition of which cannot fail to effect the greatest conceivable improvement in the condition of the sick in all Civil and Military Hospitals. The chief credit for this great result must be accorded to Miss Nightingale, whose admirable memoir,—"*Notes on Hospitals*" read at the Liverpool meeting of the National Association for the promotion of Social Science in October, 1858, and "*Answers to Written Questions regarding the Sanitary State of the Army and Hospitals*" which first appeared in the Appendix to the Report of Mr. Sydney Herbert's Sanitary Commission, and were, afterwards, published, as a separate volume, with three valuable papers on *Sites and Construction of Hospitals* by Mr. Godwin, originally printed in "The Builder,"—undoubtedly, became the prime incentive to this enquiry, while it furnished the chief guiding data for conducting it.

Before entering upon a consideration of the detail rules which should govern the Sanitary Management of Indian Hospitals, it is necessary that we should review, as concisely as possible, the important History of *Nosocomial Diseases*,—i. e. of those maladies which are prevalent in Hospitals, and nowhere else.

A few years since,—before all that happened at the Scutari Hospitals in 1854-55 was known to the public, throughout the

† Section XX., paras. 9-10-11-21-26-27.

whole civilised world,—the medical and legal advisers of one who had placed himself in jeopardy by an assault, imperilling life, would never have dreamt of conjuring his friends not to permit the injured person to be treated in any *Town* Hospital: but, if possible, to have him conveyed to some well-ventilated room in a country place, where nature's reparative powers would exert their full influence;—now, this would be the first precaution that would present itself to any man, of ordinary foresight, acquainted with the results of recent enquiry upon the subject. So, also, it would have been in the latter half of the past century, when the researches and writings of Pringle, Hales, Howard and Brocklesby had made the subject of Ship, Prison, and Hospital Fever one of public notoriety.

The history of this Fever,—the production of which must be regarded as the extreme result of neglected sanitation in crowded buildings,—affords one of the most important lessons that can be laid before the student of Preventative Medicine. Its leading points can only be given here.

Before the publication of the great works of Pringle and Howard, in 1752 and 1777, much, but scattered, information regarding the diseases generated in Jails, and Ships had been brought to light.*

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* Stowe, in his Survey, quoted by Howard, mentions that "In the year 1414, the Goalers of Newgate and Ludgate dyed, and prisoners in Newgate to the number of sixty-four." And, speaking of the King's Bench Prison, says that, in the six years preceding the year 1579, one hundred prisoners died there, and twelve between Michaelmas and March of the last mentioned year, "through a certain contagion called *the Sickness of the House.*"

According to Anthony Wood, at an Assize kept in the castle at Cambridge at the time of Lent, in 1521-2, (13th Henry VIII,) "the justices there, and all the gentlemen, bailives, and all resorting thither took such an infection that many of them died; and almost all that were present fell desperately sick and narrowly escaped with their lives."—It was considered that the disease was communicated by a poisonous stench brought with the prisoners from the Jail. Stowe, Camden, and Dr. Ethryg, a physician who then practised at Oxford, differ in the accounts of the number that died, although they agree that, among them, there was neither woman nor child.

In 1553, Hooper, Bishop of Worcester, described, in most pathetic terms, the misery to which he was exposed in the Fleet Prison; "Having nothing appointed to him for his bed but a little pad of straw and a cotton covering, with a tick and a few feathers therein, the chamber being vile and stinking, until, by God's means, good people sent him bedding to lie on. On the one side of which prison is the sink and filth of the house, and, on the other side, the town ditch, to that the stench of the house hath infected him with sundry diseases.—*Fox.*

And it had become clearly and popularly understood that Hospitals were not only places in which pestilence was apt to be generated,* but where those suffering from comparatively slight injuries or diseases were constantly imperilled by the evil atmosphere surrounding them.

Eight years later, we find that Sir Edward Waldegrave, who was imprisoned for hearing mass in the beginning of Queen Elizabeth's reign, died in prison—"*ex fœtore carceris in morbum incidens.*"—*Bridgewater's Concertatio.*

At the *Black Assize* at Oxford, in July 1577, Baker tells us, "Suddenly they were surprised with a pestilent savor, whether rising from the noysome smell of the prisoners, or from the damp of the ground is uncertain, but all that were there present, almost every one, within forty hours dyed, except women and children. And the contagion went no further. There dyed Robert Rich, Lord Chief Baron, Robert D'Oylie, Sir William Babington, &c. &c. &c., almost all the jurours, and three hundred others, more or lesse."

In 1588, an infectious distemper, brought by some Portugese prisoners who were confined at Exeter, destroyed the Judge and most of the persons summoned to the Lent Assizes.—*Holingshed and Shaw.*

Disease was fearfully rife among the unfortunate insurgents who were captured at Preston in 1715, and were huddled together in close prisons at Preston, Chester, Liverpool, and in London. We are told that consumption was very prevalent, and that the Jail Fever raged in Newgate. The excuse being that it would have been impossible to give the prisoners fresh air without risking their escape.

In 1730, at Taunton, some prisoners who had been removed from Ilchester Jail to take their trial, were considered to have infected a part of the Court, and to have produced a contagious disease, of which the Chief Baron Pengally, with some of his officers and servants, and Sir James Sheppard, Knight and Sergeant at Law, died afterwards at Blandford, in Dorsetshire.

Again, in April 1742, a "Putrid Fever" appeared at Launceston and occasioned great mortality. According to Huxham, this Fever was generated by the prisoners, and widely disseminated by means of the County Assize.

On the 11th May, 1750, at the Sessions at the Old Bailey,—four on the Bench, together with two or three of the Counsel, one of the Under-Sheriffs, several of the Middlesex Jury, and others present to the amount of about forty, and probably many others, were attacked with this disease

* I have now before me a long advertisement, published in 1741, containing proposals for the erection of the Devon and Exeter Hospital, in which it is very carefully specified that no persons, suspected of any infection, will be admitted into the house; and that, if any of the patients should be accidentally seized with any infectious distemper, such patient shall be removed to a distance place, to be provieded at the expense of the charity. It is, most emphatically, insisted that "An Hospital is more free from infection than the private dwellings of the poor," and that, "as the Governors as well as the Physicians constantly resort to the Hospital itself, to do the business of the charity, it may well be presumed they would never do so, if there was the most distance apprehension of danger."

Barrere,* observed that, in a Military Hospital, all the abscesses had a tendency to gangrene the moment they were opened. Last year, Dr. Allan Webb made precisely the same observation to me of his own patients in the Calcutta Native Hospital;—of which more hereafter.

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and perished. This occurrence led to the first publication of Sir John Pringle's "Observations on the Jail or Hospital Fever."

Pringle quotes Huxham to the effect that the same kind of fever had been frequent at Plymouth during the former war, in consequence of the number of French prisoners, and of the Hospitals and other places being crowded with men taken out of our own ships, actually ill of the distemper.

In March 1750, it was reported, in the Gentleman's Magazine, that the "Gaol Distemper" had prevailed so much, lately, in Newgate, that,—of fifty persons, which was the Middlesex commitment since last Session, eleven had died.

We are told, by Dr. Stephen Hales, that,—previous to 1748, when his Ventilators were fixed in the Savoy prison,—50 or 100 often died there of the infectious Jail Distemper, although the prison was kept remarkably clean. Whereas, in the four years subsequent, only four persons died —none of Jail fever.

In his work on the Plague, Ingram states that, many being close shut up in St. Martin's Prison, some died in a few hours there.

A writer, in 1759, asserted, probably on very loose data, that there were then more than 20,000 prisoners for debt in our Jails, and that, the corrosion of resentment, the heaviness of sorrow, the corruption of confined air, the want of exercise and sometimes of food, the contagion of diseases from which there is no retreat, and the severity of tyrants against whom there can be no resistance, and all the complicated horrors of a prison, put an end, every year, to the life of one in four of those that are shut up from the common comforts of human life. Thus perish, yearly, five thousand men, overbourne with sorrow, consumed by famine, or putrified by filth; many of them in the most vigorous and useful part of life."*

In the same year, a person who had suffered three years' confinement in Clerkenwell Bridewell, published *A Scheme for the Employment of Disorderly Persons in the House of Correction in Clerkenwell*, in which he asserted that between 60 and 70 women were, every night, confined there, in two small wards the contents of which, together, were not more than seven yards and a half square, which caused a perpetual sickness in the Jail.

Howard mentions that, from his own observations, in 1773-75, he was fully convinced that many more prisoners were destroyed by the Gaol Fever than were put to death by all the public executions in the kingdom. This shows a somewhat improving state of things, as the annual average number of executions in London was then 29 to 30.

We are told, in the Life of Sir J. Earley Wilmot, that, in 1774, Mr. Baron Adams died upon the Circuit at Bedford—as Dr. Petty reported of the Goal Distemper caught at the Old Bailey, where he attended about a fortnight before.

* Quoted by Zimmerman.

† The Idler, and Gentleman's Magazine, January 1759.

At the Leeds Hospital no case of Compound Fracture or of Trepan survived.*

According to Zimmerman, compound fractures and other wounds were commonly fatal in the Hotel Dieu, at Paris, where almost all those trepanned died. While M. Marceau was Surgeon of the Hotel Dieu, (which was fifty years) no operation for the trepan succeeded,—so that the operation was, at last, laid aside.† Dessault‡ often said that he had never seen the operation of trepan save the life of a single patient at that Hospital.

In Dublin, in 1776, the Sheriff, several Counsellors and others fell victims to a pestilential outbreak in Court.

Even at the commencement of the present century, nearly eight hundred prisoners were confined, at one time, in Newgate, and the consequence was the generation of a contagious fever.

It is worthy of remark, that the cause of these frightful calamities was distinctly recognised from the first, but that they were allowed to prevail, during nearly three centuries, before the necessity of employing fresh air and clean water, in their prevention was practically understood and acted upon.

The practice of strewing the bench and the dock with flowers and aromatic herbs was early adopted.—

"Who would be whole and keep himself from sickness
And resist the stroke of pestilence
Let him be glad, and void of all heaviness
Flee wicked airs, eschew the presence
Of infect places, causing the violence
Drinking good wines, of wholesome meats take
Smell sweet things, and for thy defence
Walk in clean air and eschew the mistes blake
* * * * * * * *
Delight in gardens for the great sweetness"

Shepherd's Kalender for Diet, and avoiding contagious sickness.—Somers' Tracts.

Lord Bacon wrote that "The most pernicious infection, next the plague, is the smell of the Jayle, where prisoners have been long and close and nastily kept; Whereof we have had, in our time, experience, *twice or thrice*, when both the Judges that sate upon the Jayle, and numbers of those who attended the businesse; or were present, sickened upon it and died, Therefore, it were good wisdom that, in such cases, the Jayle were aired before they be brought forth. Out of question, all such foul smels are made by art, and by the hand, they consist chiefly of man's flesh, or sweat putrified. For they are not those stinks which the nostrils might straight abhor and expell that are most pernicious; but such aires as have some similitude with man's body, and so insinuate themselves, and betray the spirits. There may be great danger, in using such compositions, in great meetings of people, within houses, as in Churches, at Arraignments;

* Howard.

† Observations sur les Hôpitaux, par M. Cabanis, Paris 1803, p. 180,—cited by Blane.

‡ Quoted by M. Ballard.

We cannot be surprised at this result when we learn,* that, by the statutes of its foundation, all applicants were admitted into the low ill-ventilated wards of this institution which, with no more than 1200 beds, was, in some epidemic seasons, made to contain as many as 7,000 sick, the convalescents were mixed with the sick of all kinds, and the specifically contagious cases with the ordinary sick. Here, the frightful old practice of placing more patients than one in the same bed was long continued.

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at Playes and Solemnities, and the like, for poysoning of aire is no lesse dangerous than poysoning of water.

In like manner, Mead held (Discourse concerning Pestilential Contagion, 1720), that "Nothing approaches so near to the first original of contagion as air pent up, loaded with damps, and corrupted with the filthiness that proceeds from animal bodies. Our common prisons afford us an instance of this, in which very few escape what they call the *Gaol-fever*, which is always attended with a degree of malignity in proportion to the closeness and stench of the place. And it would, certainly, very well become the wisdom of the government, as well with regard to the health of the *town* as well as in compassion to the *prisoners*, to take care that all houses of confinement should be kept as airy and clean as is consistent with the use to which they are designed."

The calamity at the Old Bailey created so much attention that the Reverend Dr. Hales and Sir John Pringle were consulted upon the means by which Newgate might be rendered more healthy. It was determined to erect one of Hales's Ventilators, worked like a windmill;—consequent upon which it was reported that the deaths in Newgate became reduced from seven or eight a week to about two in a month. The atmosphere of the Jail was so deadly that, of eleven men who were employed in erecting this ventilator, seven were seized with the distemper.

We are told that the Judge, Jurymen and Sheriffs, who were to attend at the ensuing Sessions, made strong expression of their fears at being again exposed to such imminent danger. Upon which, in consultation with Dr. Hales, directions were given to have the Jail thoroughly cleansed. Three cart-loads of the most abominable filth were carried away; and, lest the effluvia should infect the air, this was carried a considerable distance from town, and there buried ten feet under ground. After this, Mr. Akerman, the jailor, "went into this abominable Jail himself"—(we can only speculate, upon this expression, whether he had ever entered it before, and it is to be remarked that he was a man of singular humanity)—"and ordered it to be washed with vinegar, and also that the prisoners, *a day or two before their being brought down to the Old Bailey to take their trials*, should undergo the same operation. He then went to the Gate House prison, Westminster, which he found in a most noisome state, this prison he ordered also to be thoroughly cleaned and washed with vinegar, and the prisoners to be washed likewise before they were removed to Newgate against the approaching Sessions. He also went to New Prison, and Clerkenwell Bridewell, where the same orders were put

* In the article on the Sites and Construction of Hospitals by Mr. George Godwin.

I find it noticed, in an account of the Police and Sanitary Arrangements of Paris, published in England in 1763, that, "This Hospital, instead of the neatness and conveniences which are found in our Hospitals for the cure of the wounded and the sick, presents the most dreadful scene of human misery, that can be imagined; for, the beds being too few for the numbers admitted, it is common to see four, six, and even eight in a bed

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in execution, although these Jails were cleanliness itself when compared with the two former.—Whilst these measures were carrying on, the Court in the Old Bailey, and the whole house, from top to bottom, (to which nothing had been done in 30 years before) were scraped, cleansed, and washed with vinegar, and the worthy Dr. Hales had certain herbs burnt in the Court, for some days before the Sessions began, to obstruct any infection from taking place again. The leads, facing the Court, and nearly contiguous to it, were next taken up, and a great quantity of filthiness cleared away, which had been gathering there for many years before; and the two yards, under the leads, one for the reception of the men, and the other for the women prisoners, (until called upon to take their trials) were perfectly well cleansed and purified with vinegar." [*Letter to the Citizens of London, January* 13th, 1764.]

The good effects of these spasmodic measures do not, however, appear to have been at all permanent; for we find, twenty-two years later, in 1772, a report that several workmen were employed at the Old Bailey, "in making a new ventilator, and other necessary precautions to prevent the effects of any malignant distemper at the ensuing Sessions, *several persons having died who attended the last Sessions.* Among other precautions, a contrivance is made, by a pipe, to carry the fumes of vinegar into the Sessions house, while the Court are sitting." !!

Some years previous to this, in 1763, it was remarked; in the public Journals, that, "The felons in this country are worse than dogs or swine, and are kept much more uncleanly than those animals are in kennels or sties. According to all accounts from Clergymen, who are obliged to go to the goals, from whom the writer has been often assured that the stench and nastiness are so nauseous, that the very atmosphere is pestiferous, and that no person enters there without the risque of his health and life, which prevents even many Clergymen and Physicians from going there, and assisting any sick or dying men, so that they live and die like brutes, even worse than many beasts, to the disgrace of all humane sentiments."

This writer suggested that, "The gaolers ought to be forced to have all the rooms sprinkled and fumigated with vinegar every day, as should all the felons before their appearance in a Court of Judicature; for some hundred prisoners, particularly criminals, are yearly killed by a sort of pestilence and vermin, occasioned by filth, nastiness, and a corrupted air." As an after-thought, this writer adds, in a postscript—

"All Hospitals, Prisons, and Work Houses should have bathing places, for the sake of cleanliness and health, as in Asia."

It will scarcely be believed that, in the last edition of Howard's work, (1792) the necessity that, in Jails, "There should be a commodious Bath, with steps, (as there is in some country hospitals), to wash prisoners that come in dirty, and to induce them, afterwards, to the frequent use of it" had still to be insisted upon.

together, lying four at one end, and four at the other,—groaning, under various degrees of various distempers. Some languishing in silent misery, some raving in a delirium, some dying, and others dead." It is added that, at the other Hospital, called the "*Charity*," the patients were relieved in a more decent and effectual manner, and the burials were "not more than one-third of what they were in the Hotel Dieu, in proportion to the number received."

About the time when John Howard began to take cognisance of the matter, a genius arose, in the person of Dr. J. Cook, of Leigh, a would-be popular Medical writer of the day, who,—without going so far as to recommend that the unfortunate culprits should enjoy the benefits of frequent ablution with fair water, throughout the term of their incarceration,—insisted that, "It would not be amiss for prisoners to be well vomited with antimonial wine, a night or two before they are tried, and their foul bodies to be well washed with vinegar and water, or water in which brimstone has been boiled, or blacksmith's forge water, that morning before they enter the Court"!

The researches of Pringle, Lind and Bancroft clearly demonstrate that the Hospital and Ship Fevers depended upon the same causes as the Jail Fever, and were of precisely the same type.

Dr. Lind maintained, in his *Essay on the Health of Seamen*, that "The source of infection to our Armies and Fleets are, undoubtedly, the Jails; we can often trace the importers of it directly from them.—It often proves fatal in impressing men on the hasty equipment of a fleet. The first English fleet, sent last war to America, *lost by it above two thousand men*." He, elsewhere, stated that, The seeds of infection were carried from the guard-ships into our squadrons,—and that the mortality, thence occasioned, was greater than by all other diseases or means of death put together.'

As described by Pringle, this disease appears to have been sometimes a Typhus, at others a Typhoid fever of great malignity. There was a "petechial efflorescence" which was the frequent, but not inseparable attendant of the fever, which was sometimes of a brighter or paler red, at others of a livid colour, but never rising above the skin, the spots were so small but generally so confluent that, at a little distance, the skin appeared only redder than ordinary as if the colour were uniform; but, upon a nearer inspection, there were interstices seen. For the most part, this eruption was so little conspicuous that, unless looked for attentively, it might, escape notice. The spots appeared thickest on the breast and the back, less on the legs and arms;—the nearer they approached to a purple colour, the more were they to be dreaded. In a few cases, instead of spots, Pringle observed purple steaks and blotches. The petechiæ would, sometimes, not appear till after death. Despondency and a dejected expression of countenance were generally noticed. When the sick lay warm and there was no preceding flux, the bowels were usually confined; but, when they lay cold, as they often did in field hospitals, a diarrhœa was a common symptom, but it was not critical. In the worst cases, a flux appeared in the last stage; then the stools were involuntary, colliquative, ichorous or bloody and had a cadaverous smell, the effects of a mortification of the bowels. Some were never delirious, but all were under a stupor or confusion. Though of a

Between 1770 and 1780, the crowding was such that Huncowski* declares that he often saw, on the same bed, a dead body lying beside two dying patients and one convalescent.

All this would be incredible if we did not receive it on several authorities. Formerly, the disgusting custom of placing more than one patient in each hospital bed was usual.—Several engraved titles of medical works, printed in the seventeenth century, represent glimpses of hospital wards with two patients in every bed. In most of the continental hospitals, which Howard visited, each of the patients had a bed (often of iron) to himself; but, in a few, the patients

continued kind; this fever had generally distinct exacerbation at night, with remissions and often partial sweats in the day.—Pringle added a remark, well deserving of attention in the present day,—that there were, sometimes, slight degrees of this fever hardly to be described and *which can only be discovered in field hospitals by observing the men to languish, though the nature of the illness for which they came in should seem to admit of a speedier cure.* In such cases they have whitish tongue, they complain of slight headaches, of want of appetite, and other inconsiderable feverish symptoms.

Pringle described this disorder as "incident to every place ill aired and kept dirty, that is filled with animal steams from foul or diseased bodies;" "and, upon this account," he remarked, "Jails and Military Hospitals are most exposed to this kind of pestilential infection; as the first are in a continual state of filth and impurity, and the latter are so much filled with the poisonous effluvia of sores, mortifications, dysenteric and other putrid execrements.

"I have seen instances of its beginning in a ward where there was no other cause but one of the men having a mortified limb. Nay there is reason to apprehend that, when a single person is taken ill of any putrid disease (such as the small pox, dysentery, or the like) and lies in a small and close apartment he may fall into this malignant fever. This I have actually known to happen in camp, when any one has been seized with such a disorder, and kept his tent too close."

This was, evidently, the disease which Dr. Leonard Gillespie (quoted by Trotter) observed after the Battle of the 1st of June 1794,—"The French Prisoners," he says, "confined in the hold in calm, sultry, foggy weather, were soon attacked with fever in considerable numbers. The origin of it, the subject it attached, the extreme debility, despondency, universal lassitude and pains, dejection of countenance, fætor of the breath, irregularity of type and the eruption of petechiæ or marbled appearence on the skin shewed the malignant nature of the disease which, with Sauvages, may be termed *febris nautica*; with Huxham and others, *febris putrida, maligna, petechialis;* with Burserius de Kunefield,—who, in opposition to most of our English authors, and I think with justice, looks on it as an exanthematous fever *sui generis,—morbus petechialis*, and to which opinion the people accede, terming it the *purple fever*." Such was the disease of which Dr. Trotter has given us a vivid description as prevailing in a Portuguese squadron which, about the same time, arrived in Hamoaze "to

* Cited by Hawkins.

slept double. The Hospitals of Saint Louis and the Hotel Dieu, "the two worst hospitals that he ever visited" were so crowded that, formerly, he had often seen five or six in one bed, and some of them dying. In 1783, many of the female patients were two or three in a bed. In the Omagh Hospital, for the county of Tyrone, he found, in 1987, that "*Two*" (boys) "*lay in the bathing tub*, which was five feet nine inches by three feet six." ! ! So late as 1704, Dr. Thomas Trotter tells us,* that, "at the Sick Quarters of Dartmouth, men in Fevers were found lying two and two in a bed!" The last trace of this barbarism appears in the Medical Regulations of H. M.'s Army, of 1859, (Sect. XX. para 12, page 79,) where it is insisted upon that "The Surgeon or Medical Officer in charge shall satisfy himself that every Soldier in Barracks and every Patient in Hospital has a separate bed."

A Commission of the Royal Academy of Sciences, who enquired into the state of the Hotel Dieu, in 1782, reported that the small-pox cases were sometimes more than two in a bed. In the Surgical wards, they found three or four parturient women lying on a single bed, festering in corruption and humidity, and respiring the foulest air. They, especially, called attention to the very great mortality from Surgical Operations, and attributed the enormous mortality, in Puerperal Cases, to the infectious vapours continually evolved from the Surgical Cases. It had been observed, and recorded so early as 1666, that the more Surgical Cases, the greater was the tendency to Epidemic Fever; and the Commission now distinctly stated that the great mortality was due to the general infection of the air. According to Hawkins, at the end of last century, the mortality in

refit and purify" the Europe, a third rate in ordinary, was allotted to them as an hospital, and was filled accordingly; but, from the numbers daily taken ill, she became crowded in the space of three weeks. There were five hundred people in different stages of the fever on board "The orlop deck being full in every corner, from its imperfect ventilation, was literally pestiferous. The smell was intolerable; we walked round the fore and after cockpits; but were not able to make many inquiries, or to attend to every particular; indeed respiration could not be immediately accommodated to an atmosphere, not only deprived of much of its oxygene but strongly charged with contagious matter. The moaning and ghastly looks of the whole; the skin sallow, livid and black; petechiæ and vibices, tremors, subsultus tendinum; and, in a few, general convulsions; groans of the dying and those in pain; raving of the delirious; tongue black, parched and tremulous, the breath fœtid, respiration quick and laborious, the eyes sunk, fixed, glassy, moistened with tears; were among the prominent features of this hideous groupe of human misery.

* Medicina Nautica, an Essay on the Diseases of Seamen, Vol. 3, Edition 2 p. 84.

the Hotel Dieu was about one in four of all admitted. In 1822, it was one in six or seven.

Describing the diseases of this hospital, an old French writer* says. "A young surgeon, bred in the Hotel Dieu, may learn the various forms of operations, and the method of dressing sores; but the way of curing wounds he cannot acquire. Every patient he takes in hand (do what he will) must fall a victim to gragrene."

We learn elsewhere† that, in 1814, out of twenty two amputations, performed in this hospital, not one escaped the ravages of Hospital Gangrene; and are assured by Tenon that, when lying-in women were admitted there, the mortality among them was about 1 in 15, while that in British Hospitals was only 1 in 60. The still-born were 1 in 13 in the former and 1 in 25 in the latter.

Dr. Paul Topinard,—who is, at once, the most recent and least prejudiced authority regarding the sanitary condition of Parisian Hospitals,‡—deliberately comes to the conclusion, that the mortality attending serious operations, in general, is much greater in Paris than in London. That the mortality, in amputation of limbs, is considerably greater in Paris, and that pyæmia is more frequent there. He attributes the greater mortality to the method of dressing wounds, with enormous masses of charpie, compresses, and bandages, adopted in his country, to the want of purity of air in the wards of French Hospitals. The very sight of these dressings, and the air of the wards are trials which the young student can rarely bear. In the London Hospitals, things go on very differently. The visitor may walk freely about in the wards, without suffering the slightest inconvenience; there is nothing to shock either his sight or his feelings; he meets with no fœtid and extensive suppurations; there are no dressings painful to the patient, the surgeon and his assistants; he hears no unanimous cry of dread at the hour of visit; he might fancy himself in the dormitory of a Model College.

M. Topinard was also struck with the few patients in our wards, the comfort of the ward-*annexes*, the number of the nurses, the small size of the beds, and the absence of those

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* Cited in a series of articles on Inflammation; in the 5th vol, N. S., of the India Journal of Medical and Physical Science.

† Ballingall.

‡ As quoted in the *Medical Times and Gazette*, May 12th, 1860.

abominable curtains which the French Surgeons seem so much to admire. In all these facts, and in our large fire places, and natural mode of ventilation—in a perfect system of Hygiene—he sees the cause of the lesser mortality in English Hospitals; and also in our free administration of food, in our water dressings, in our rejection of charpie, and in our attempts at union by the first intention.

When Howard visited the Hospital at Avignon, fair attention appeared to be paid to cleanliness and air; but, yet, the Surgeon complained that "the Slow (Hospital) Fever" was produced by the infectious air of the house. At the Hospital de S. Jean de Jerusalem, Malta, "The Slow Hospital Fever (the inevitable consequence of closeness, uncleanliness and dirt) prevailed."

The London Journals, of 1765, record the trial of one Thomas Bradley, for the murder of Philip Barry. It appeared that the parties fought in the street, and that Barry was slightly wounded. The House Surgeon of the Middlesex Hospital, where Barry was treated, stated, in evidence, that he never saw but one wound, and did not observe that to be dangerous in the least; he walked about the ward, and was in a good way; there was a change about four or five days before his death; he had contracted a fever in the house, "*which was a very common case; it might be by the foulness of the air in the house.*" He imputed his death to the fever.*

It was not until the first half of the 18th century was past that England could reconcile herself to the maintenance of a Standing Army. About 1739, several Barracks were first built in the neighbourhood of London,—an innovation which excited a great deal of angry suspicion in the public mind. These Barracks were—"A sight to which this nation hath never been accustomed."† They had "very much the air of those citadels which, in arbitrary countries, are erected to keep the People in Awe," The Citizens of London took the

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* Again, in 1777, one Weaver died here from sword stabs, after lingering 11 days. The Surgeon deposing that the wounds were not mortal, but that death was caused by Fever, the accused was acquitted.

The Middlesex Hospital was then a new building, having been opened in 1745. Its early career, however, was not prosperous. When Howard visited it, only 4 of its 16 wards were occupied, the funds being very low. The rooms were, generally, close and dirty; the bedsteads and wooden testers were old, the house wanted white-washing, and the whole had an air of poverty.

† The Craftsman, February 3rd 1739.

alarm, and cried out, with one voice, that "they would have no *Red Coat Nurses.*" Indeed, one popular writer of the day became so much excited in his fears, that he "could not help being of opinion that, if it had happened in the days of our ancestors, the Director would have had very good luck if he had died in his bed."*

We may, therefore, well expect to find that, a little later, the comfort of our troops, in Hospital, was not deeply consulted. Dr. Brocklesby, Physician to the Army, writing in 1763,† stated that the register kept of military men who died of Fevers of various kinds, proves that more than eight times as many fall by "the Petechial or Gaol Fever" as by Battle.

He remarks, "The" (Camp) "Hospitals are generally such as would quickly destroy those who should be confined in them, even if sent thither in perfect health. The Hospital is generally a small old house with low ceilings, small lozenge windows that are not suffered to be open, with a view to keep the men warm, and yet save the expense of fire; several close cells above, and only one large room below, which, being the place where all crowd together that are able to crawl, is little less infectious than the rest of the house: in a wretched rotting building, with damp walls and shattered roof, intended to hold a family of seven or eight people, 50 60 nay 70 or 80 poor sick soldiers are, frequently, huddled together, lying heel to heel, in stinking clothes and foul linen." "Is it, then, strange"—he exclaims, "that, *in such places, diseases are rather generated than cured*? that simple inflammatory fevers immediately become putrid, spotted and petechial? Air, says the ingenious Dr. Pringle, that is become putrid by confinement, stagnation and animal effluvia is, of all causes of sickness, the most fatal and least understood; *these destructive steams work like a ferment, and ripen all distempers into putrescence and malignity.*"

Barracks had now been provided in some of the Garrison towns. They ought, Brocklesby says, to be different from those at Chatham and Portsmouth, where the ceilings were low and ventilators wanting. There do not appear to have been any separate hospital buildings here, but the sick must have been crowded into the worst rooms, as it is said that "The small-pox apartments in one of these places are rooms little more than

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* Common Sense, of the same date.

† *Œconomical and Medical Observations, &c., on Military, Hospitals, and the Cure of Camp Diseases.*

six feet high, with windows that cannot be opened; and, in these, no less than 16 loathsome bodies were often crowded, so that they fell into spotted fevers, and petechial eruptions were manifest, totally different from those of the small-pox. *These Barracks sweep off the men like a perpetual pestilence.*"

In 1773, we find a sensible anonymous writer, on the sanitary defects of London, remarking that "The institution of our public Hospitals is, undoubtedly, founded on the principle of benevolence to the poor; but, by the ignorance or inattention of the founders, the success of their schemes has not proved equal to expectation. *By the situation, construction and œconomy of these infirmaries, an inherent contagion is produced, the fatal consequences of which are, too frequently, experienced by unhappy patients received into them for the cure of accidental injuries.*"

Three years later, another writer observed that, "One of the most universal and dangerous channels of infection has its source in the state of the Hospitals in this City," (London), "which are usually so contrived as to be peculiarly adapted to generate contagion."

Dr. White, of York, (1778) says, "Diseases which usually, in private practice, are of an easy cure, are often very tedious in Hospitals, and apt to assume anomalous symptoms. Healthy persons, admitted for the cure of recent wounds, and other accidents, soon become pale, lose their appetite, and are generally discharged weak and emaciated, but soon recover by the benefit of fresh air. In some Hospitals, the cure of compound fracture is rarely seen; in private practice, and a pure air such cases seldom fail.*

Even so lately as 1828, the Governors of St. George's Hospital,† in proposing the erection of a new building, admitted that "It is well known that the closeness of the wards, in the old building, has long been a subject of the deepest regret to the Physicians and Surgeons who have observed its effect in preventing or retarding the cure of their patients."

With the knowledge which we possess, it is, of course, only necessary that we should state, for the sake of demonstration, that,—while the leading morbific influences which affect the inhabitants of a town, or the men of a regiment, are displayed in the characters of the diseases admitted to hospital,—the

* Phil. Trans. Abridged, Vol. 14, p. 326.
† Cited by Hawkins.

sanitary condition of each hospital, as affecting the health of its inmates, is most clearly expressed in the manner in which wounds heal there. The law of Nature being that, in healthy men favourably circumstanced, recovery from all reparable injuries is uninterrupted and rapid.

Among Surgical Patients, of sound constitution, placed for recovery in an uncontaminated atmosphere, no common lesion to a vein will produce deadly phlebitis; stumps heal almost by the first intention, the sloughing of irreparably injured parts is a safe, localised and rapid process. The peritoneum, when torn or slit, is repaired as kindly as any other structure. Under similar circumstances, the consequences of child bearing are never dreaded.

On the other hand, the records of the past—(which are of inestimable value to the student as displaying the deadly results of absolutely neglected sanitation in their broadest malignity, and which are, on that account, so largely cited in this article—and our own daily experience concur to show that,—where a Ship, a Jail, a Barrack or an Hospital is overcrowded, or exposed to an evil atmosphere,—deadly Contagious Fever or Hospital Gangrene is rapidly generated,—this without personal uncleanliness, bad food, or deficient clothing. Of the truth of this principle, the history of the Fever or board the *Eclair*,* and of the diseases which committed such devastation among the children of H. M. Troops who were embarked for India in 1859, as well as those of the destructive endemics which have, comparatively of late years, become developed in some of our prisons afford ample evidence.

Where personal uncleanliness and a tendency to scurvy are superadded,—as was, evidently, the case in those putrid ship fevers and calentures of which we read in the narratives of the old voyagers, and in the works of Lind and Blane,—the disease gains a still more intense and deadly character.

In Hospitals where the Surgical cases are not sufficiently separated from the Medical, where Bowel Complaints abound, and, especially, where the outward atmosphere is foul, Hospital Gangrene will be found endemic, however perfect the ventilation, the dieting, and the attention to internal cleanliness may be. A marked illustration of this will, presently, be given in the existing condition of the Calcutta Native Hospital.†

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* Vide Author's Treatise on Removable and Mitigable Causes of Death; page 284.

† A striking illustration of this principle occurs in Dr. Parker's account of the Russian Hospitals, during the Crimean war, (*American Journal*

In the larger Indian Jails—where, except in overcrowding with miserable inmates, the sanitary arrangements are generally tolerable—a liability to Hospital Gangrene prevails.

In Hospital Gangrene,—as it used to occur in ill fitted fleets in former times, and as it has presented itself of late, on several occasions, in campaigns, among our Bengal troops,—as after the Battle of Ferozeshuhur, at Rangoon in 1825-6, and in Lucknow,—the pre-disposing influence of a Scorbutic State of the System, operating in association with most of the other recognised causes of Hospital Gangrene, has been self-evident.

The sick and wounded in Hospital are, of course, liable to be affected by epidemic influences from without. Thus, in India, the first outbreak of Epidemic Cholera in a Regiment has, in several noted instances, been among the sick in Hospital. In like manner, possibly,* arose the prevalence of Tetanus among the hurt in Lord Rodney's actions in the West

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of Medical Science, April 1860) most of the buildings employed were ill adapted for the purpose, being dwelling houses or public buildings, which could be spared for the time. In all these temporary hospitals, there was a great want of ventilation, the dwellings, particularly, being cut up into chambers ten feet by fifteen and, sometimes, less. The only means of ventilation were small valves in one of the upper window-panes, about six inches in diameter, and it was only an occasional window that was even blessed with this air-hole. The doors, communicating between the different apartments, were always left open. Small single cots were packed in as closely as possible, leaving barely room enough for the surgeon to walk between. Sometimes, after a fresh arrival, the floors would be covered with patients before they could be distributed. The floors, which were waxed and polished, were kept as clean as possible, and were frequently wiped with a solution of chlorinated lime, as were also the feet of the cots. Proper ventilation was one of the principal subjects of contention between the American and the Russian surgeons. It was quite common for all of the latter to suffer from headache, before they had been in the hospitals an hour. The windows were never opened, except upon their order, and were closed immediately after they left. Even in the wards where gangrene reigned supreme, the Russians did not seem to appreciate the actual necessity of pure air in typhus and gangrenous wards. The average number of sick and wounded, at Simphopol during the winter of 1855-56, was 15,000. The average number of daily sick, was 133, mostly from Typhus and Gangrene. Erysipelas was rife. Hospital gangrene, in wounds and stumps, was the great curse of the surgical wards. The patients had a good diet, being served with soup, good fresh meat, rye and buckwheat bread (which they preferred) and, occasionally, good light wheat bread, rye, whiskey twice a day and, sometimes, wine. Of twenty seven young American surgeons who served in the Russian Hospitals, nine died of disease contracted in the wards—seven of typhus and two of cholera.

* Blane.—Observations on the Diseases of Seamen, p. 519, et seq.

Indies, in 1782, in Gibraltar Hospital after Trafalgar, and among our wounded, from Ferozeshuhur, at Ferozepore.

These mysterious outbreaks of Tetanus, among the wounded, still afford an interesting subject for sanitary investigation. It is not improbable that the Ships and the Hospitals were more in fault than the climate. Blane remarks that, "This accident affected some ships remarkably more than others, particularly the *Barfleur* and *Bedford*, though their wounds had nothing peculiar, nor were in a greater proportion than in the rest of the fleet. Four were carried off by it (traumatic tetanus) in each of these ships." "*It has formerly been observed*," he adds,—and this is a point of great sanitary importance,—"*that great ships acquire peculiar habits, or dispositions, which incline the constitutions of the men to one disease more than another.* This complaint took a run in some particular ships last year; also after the battle of the Chesapeak, and I have known it prevail in some particular hospitals more than others."

So also Dr. Simpson, of Edinburgh, now our first authority on Surgical and Puerperal Fever,—most justly observes—"Perhaps even Hospital wards get deteriorated by long use, and the emptying, cleansing, and white-washing of them, from time to time, is, no doubt, a prophylactic measure of paramount importance. Old Surgical Hospitals, and old Surgical Wards seldom offer such good returns, from practice, as newer Hospitals and newer Surgical Wards"* Every practical man is guarded against the danger of scrubbing the main and lower decks of a troop ship, so long as dry scraping will suffice, and of scouring the often rotten and always filth-impregnated floors of an English Surgical or Midwifery Hospital, where Erysipelas and its congener, Puerperal Fever, are often present and ever dreaded.†

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* Clinical Lectures on the Diseases of Women. *Medical Times and Gazette* May 14th, 1859, page 491.

† It is interesting to note, in the writings of Howard, his frequent recognition of the principle that, whatever attention may be paid to ordinary cleanliness, the floors, walls and ceilings of crowded public buildings, long inhabited, contract impurities which become the sources of disease. Hence his strong approval of the *Summer Rooms*, for convalescents, which he speaks of as "a wise expedient peculiar to Russia, deserving the highest commendation;—by a constant succession of patients, the walls of other hospitals are soon contaminated; but, in Russia, by lodging patients in these Summer rooms, the hospitals are left to be refreshed and purified."

No one, in the present day, can well imagine how intense were the stenches which produced the Ship, Jail, and Hospital Fevers and Gan-

It is almost needless to say that Puerperal Fever, ordinarily a true Hospital Disease,*—the "*Hospital Puerperal Fever*" of Armstrong and his predecessors,—occasionally prevails as an Epidemic; and, then invades Lying-in-Hospitals. An occurrence of this kind, at the Wurzburg Obstetrical Establishment, has lately been recorded† by Dr. Von. Franque:—30 cases occured in 99 deliveries, Puerperal diseases prevailed, at the same time, not only in Wurzburg, but also in its vicinity, which were not treated by the practitioners who were in attendance at the Institution. Doubtless, close inquiry would always reveal palpable defects in the sanitary arrangements of institutions, thus invaded;—even if the reception of a large number of parturient women, in one building, be not, in itself, a grave sanitary error. The institution, now in question, is described as being recently established and well constructed and arranged, as being surrounded with gardens, and well exposed to the air. It is calculated to contian 30 pregnant women and has never been over-crowded. It is, however, worthy of remark that the building is *new*—a disadvantage, which will presently be discussed, and that it receives a few women suffering from disease,—a most serious error in the management of such an establishment.

In dealing with the lamentable fact, of which all Medical men have had so much dire experience, that zymotic diseases gain access to our British Hospitals, and there spread among the patients, the nurses and the students, Miss Nightingale

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grenes of last century. Howard tells us, that "Air which has been breathed is made poisonous to a more intense degree by the effluvia from the sick, and what else in prisons is offensive. My reader will judge of its malignity, when I assure him that my clothes were, in my *first* journies, so offensive that, in a post chaise, I could not bear the windows drawn up, and was, therefore, obliged to travel, commonly, on horseback. The leaves of my memorandum book were often so tainted that I could not use it till after spreading it an hour or two before the fire: and even my antidote, a bottle of vinegar, has, after using it in a few prisons, become intolerably disagreeable. I did not wonder that, in those journies, many gaolers made excuses, and did not go with me into the felons' wards. "I learn, from a letter to Sir Robert Ladbroke, printed in 1771, that, "Dr Hales, Sir John Pringle, and others have observed that air, corrupted and putrified, is of such a subtile and powerful nature, as to rot and dissolve heart of oak, and that the walls of buildings have been impregnated with this poisonous matter for years together."

* Harty, without denying that Puerperal Fever may occur as an Epidemic, remarked that "Erysipelas" Malignant Ulcer, and Puerperal Fever seldom extend their influence *beyond the walls of Hospitals* or other places where the sick may be crowded together.

† *Scanzoni's Beitrage, and Medical Times and Gazette,* July 1860.

justly argues that—"No stronger condemnation of any hospital or ward could be pronounced than the simple fact that any zymotic disease has originated in it, or that such diseases have attacked other patients, than those brought in with them." Miss Nightingale holds that disease will not prove "infectious" or "contagious" in a hospital where the sanitary arrangements are perfect. The spread of such disease is not inevitable, but simply the result of carelessness and ignorance. This is taking high sanitary ground, which rests upon a broad fact, long recognised by the physician who, on entering a large well-ventilated ward, where his typhus patients are, will thoroughly examine each, stooping over them, throwing off the clothes, turning them round in search for maculæ and the first signs of bed sores, and thoroughly auscultating their chests, without the slightest dread of the disease:—but, when the truly great and practical authority whom we are quoting carries the argument one step farther, and declares that,—"With proper sanitary precautions, diseases reputed to be the most 'infectious' may be treated in wards, among other sick, without any danger,"—we are brought, suddenly, to a standstill; we "scent danger in the air," and can only reply, borrowing a turn of expression from Coleridge,—true, providing we are infallibly certain that our sanitary precautions are infallible.

Not to enter upon the questions of contagion and infection, wherein are involved great truths, the attempt to unravel which has cost physicians more time, writing, and temper than would have sufficed to establish the whole of the indisputable facts of our present sanitary system, a quarter of a century sooner than we have received them,—no one doubts that every patient with typhus, hooping-cough, measles or scarlatina is a focus of disease—whence typhus, hooping-cough, measles, or scarlatina, and possibly, in the mysterious operations of nature, other occult morbific influences are liable to spread. Would any physician permit his children to sleep close around one suffering from either of these diseases, in the largest and best ventilated apartment that could possibly be selected? Even in the examination of their fever cases too, medical men observe some cautions—they do not allow the patient to breathe in their faces, they do not apply the bare ear, and they avoid examining the back of the chest, until after the patient has been raised for a short time. Admitting the long-recognised fact that abundance of fresh pure air operates most powerfully in rendering fever poison innoxious, and in

preventing its spread,* we have no grounds for believing that it has the power of destroying it at its source—of preventing its emanation from the bodies of the sick. While this is undeniable, are we justified in placing other sick, especially Surgical Cases, in *an atmosphere of poison,* however diluted.

To have the best prospect of recovery, the subject of a severe compound fracture or a capital operation ought, with his attendants, to occupy a separate building; a certain and large amount of danger is incurred by placing him in hospital atmosphere; which is infinitely more contaminated by the animal exhalations from the lungs and bodies of patients, emaciating under the active processes of disease, than the air of a barrack ward of like size, containing the same number of healthy occupants would readily become; and this peril is increased, ten fold, if the ward, or even the building, is occupied by cases of Bowel Complaints, Erysipelas, Common Ulcers, Ulcerating Malignant Disease or Fever Indeed, any person, in extreme sickness, is a dangerous neighbour for a Surgical Patient.

A recognition of this most inportant principle led to the establishment of the Calcutta "Fever Hospital;"—Sir Ranald Martin, then Surgeon to the Native Hospital, strongly recommending the institution of a Charity for the reception, exclusively, of *Medical Cases,* whereby the utility of the Native Hospital, as a Surgical Institution, would be greatly enhanced. "*He had often thought that he did injury to Wounds and Ulcers by admitting numerous cases of Fever and Dysentery,* but he could not avoid it.

What has followed? Ever since Martin's time, that Endemic Hospital Gangrene which he found so inseparably inherent in the wards of the Native Hospital, and Traumatic

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* In the middle of last century, Dr. Matthew Hales had a thorough practical insight into this principle, and based his system of ventilating Jails, Hospitals and Ships upon it.

"Contagion, like all other poisons, must subsist in some definite quantity or degree of concentration to be capable of producing its deliterious effects; and, though the *minimum,* or least point of activity under which, when reduced by diffusion, it becomes innoxious hath not, and perhaps cannot be precisely ascertainted, yet we have sufficient evidence to satisfy us that this subsists at no great distance from its source," *Dr. Percival, of Manchester, in a letter to Capel Loft Esquire,* 1786.

"To a hyperoxyjenated atmosphere, or one possessing its due proportion of oxygene, we look for security against infection, not as acting by chemical combination, on contagious miasma; but as supplying the human body with quality, that enables it to resist the offending power," *Thomas Trotter M. D.,* in 1804.

Erysipelas,—a disease of very infrequent occurrence, elsewhere, in India,—have never left that institution; where, to this very day, cases of Compound Fracture, Scalp Wound, Dysentery and Cholera lie side by side. The Fever Hospital, now the Medical College Hospital, diverted from its original destination, is, at once, the chief Surgical Hospital of Calcutta, and a receptacle for crowds of wretched native patients moribund from Dysentery, Cholera, and Malarious Fevers. Can it be wondered that, although this institution affords a much safer lodging for surgical cases than the Native Hospital does, the worst forms of Surgical Fever, not unfrequently, occur in its magnificent wards ?*

A very marked illustration of this principle, although upon a limited scale, was given by M. Ballard, in 1845. Four capital operations had been performed, during the previous winter, in the Hospital at Besancon by a skilful surgeon, upon individuals in the Civil Wards and *in the midst of patients, suffering under Diarrhœa and Typhus Fever.* All terminated, unfavorably, after the 30th day; whilst, in the Military Wards, three operations, equally severe, were followed by a rapid cure.

The practice of herding together, in the same ward, cases of Surgical Injury, Fevers and Bowel Complaints can only be ranked with the cruelty of Maxentius who bound the living to the dead. Fifty years hence, Surgeons will describe it as a relic of that barbarism which led their ancestors to heap up their unburied dead in church vaults, to gibbet their malefactors along the high-ways, and to spike the heads and quarters of their state criminals on their city gates.

Typhus and other contagious diseases are, of course, liable to be introduced into, and to be propagated in Ships, Barracks, Jails and Hospitals, which are not, in themselves, extremely unhealthy, but in which the sanitary arrangements are deficient. Thus, in 1754.† The Rev. Dr. Hales wrote that, having succeeded in introducing the use of his Ventilators in several Hospitals and Metropolitan and County Jails, he found it "to be wished that they were put into all the gaols of England and Wales, not only for the sake of the prisoners, but also, thereby, to prevent the great inconvenience of com-

* Dr. Fayrer, Professor of Surgery in this Institution, informs me that, out of 14 amputations performed in the First Surgeon's ward, during the 12 months, ending May 1860, ten deaths took place;—5 from Pyæmia 1 from Gangrene, 1 from Tetanus, Exhaustion 1, Shock 1, from a large, dose of Bazar Opium, Conveyed to the patient by his brother 1.

† A further Account of the Success of Ventilators, &c.

municating the infectious gaol distemper, from unventilated to ventilated gaols, as was, some years since, the case from Reading to Winchester gaol: and is, but too frequently, the case at Newgate, where numbers of prisoners are brought, every Sessions, from very noxious infected gaols, such as the Gatehouse in Westminster, Clerkenwell, &c."

We, however, know, from what happened afterwards, that the introduction of Ventilators was not, alone, sufficient to prevent Newgate from generating her own pestilence.

So also, at the beginning of the present century, Dr. Trotter shows* how generally ordinary Typhus Fever was introduced into King's Ships by sending on board newly raised men, volunteers and impressed, who had been previously confined in the *press rooms* of tenders—"which were, literally, prisons where air, so necessary to human life, was almost excluded." When we come to look into the detailed histories of these several outbreaks, we discover that,—although the ships in which they occurred are generally described as being healthy and cleanly, (having, undoubtedly, been, for the most part, freed from those influences which, some years previously, had made them the foci of putrid ship fevers),—they fell far short, in these respects, of H. M. Ships of the present day. In several, the upper decks were leaky, consequently perpetual dampness reigned between decks; in others, "the great indiscretion of drenching and soaking the decks with water" was persisted in. In many, probably, the stench from the head gained free access to the sick berth;† in nearly all, personal cleanliness appears to have been "intermitting," and "spasmodic," as the reports show that there was, generally, a great wash up of dirty clothes immediately the infection became fully developed on board.

Fifty years ago, *the Classification of Patients, and the Segregation of Wounded from Sick* were better carried out, in large

* Op. citat., Vol. 3, p. 176.

† When I recollect the Surgeon of the "Magnificent," in his elegant retirement at Kensington, still full of talent and vivacity, enjoying the well-earned reputation of having introduced one of the greatest improvements in modern surgery,—the thin round ligature,—and of having placed on record the best account of the Bulam Fever,—and then read that all that he could do to free his impested sick berth from the invasion of the "great quantity of sulphurated hydrogen gas" from the head, which rendered it "very offensive and disagreeable," was to propose to Captain Bowater to nail boards on the seats on that side where the sick berth is placed,"—I cannot wonder that sanitation made tardy advance in the Navy, or that it was very long before Typhus and Malignant Ulcers could be driven out of H. M. Ships.

Hospitals, than they generally are in the present day,—some striking examples of this fact will be found below.*

* Howard found that Haslar Hospital had its "Fever," "Flux," "Recovery," and "Small-pox Wards." The proper patients only were to come into these wards, and no others whatever. There were two Fever Wards at the Chester General Infirmary;—but, in describing the London Hospital, he observes.—"In this, and our other Hospitals, Medical and Chirurgical patients are together." At Rome, most of the public Hospitals were crowded and offensive, but that of *S. Maria della Consolazione* was clean and perfectly free from any offensive scents; and, here, *no patients were received except such as had wounds or fractures.* The Pest House, near Leyden, had a large separate room for the reception of wounded seamen. In the Hôtel-Dieu, at Lyons, separate portions of the house were set apart for those that had fevers, for the wounded; for lying-in women, and for convalescents. At the great Hospital, Bourdeaux, there were separate wards for Medical patients, for Chirurgical (blessée) and for those that were very ill.

At the Hospital of Savona, the old Surgeon went over the wards with Mr. Howard, and observed, "how improper it was not to separate Chirurgical from other patients, or to suffer, as often happens, a person with a fractured bone to be with a person in a Fever (though in separate beds) on each side of him." In the noble *Hospital del Rey*, Burgos, the Chirurgical patients were separated from the others. At the great Hospital, Pampeluna, there was a distinct ward for Chirurgical patients. In the two Hospitals Lá Courtesse and St. Sauveur, at Lille, the patients were distinguished into three classes, viz. wounded, very sick, and recovering; each class had a separate ward. Madame Necker's Hospital appears, then, to have been the only one, in Paris, where the Medical and Surgical patients were separated. In Frederick's Hospital, Copenhagen, a "proper separation" was made between the Medical and the Surgical patients. The wards were not crowded, each patient had a bed to himself, and Howard remarked that it was the custom to whitewash these wards every year; adding, "if this were universally practised in hospitals and prisons, it would have a very beneficial effect." At Cronstadt, the Hospital had been intended for a palace. There were separate rooms for convalescents and scorbutics. Those patients who were attended by the Surgeons were separated from the rest. In Florence, at the great Hospital S. Maria Nova, there was a mens' Fever ward, and there were separate wards for Wounds and Fractures. In this city, the Hospital S. Paolo della Convalescenza was set apart for the reception of recovering patients. In the *Real Hospital General*, Madrid, there were rooms (carefully separated) for dropsical patients and for consumptives, the disease of the latter being considered highly contagious. At the great Hospital, Milan, although the wards were dirty and offensive, care was taken to separate the patients, in Fevers, from those who were attended by Surgeons. In the Hospital for the Galley Slaves, Naples, the patients were distinguished into three classes—very ill, sick, and recovering. Here, the great and crowded Hospital of *S. Apostoli L'Annunziazione* had wards appointed to the cure of wounded persons. At Civita Vecchia, in the Galley Slaves' Hospital, particular rooms were appropriated for such as had cutaneous disorders, and another for consumptive patients;—the Physicians of Italy also being convinced that consumption is a contagious

And very many instances might be adduced in proof of the fact that our ancestors,—(or rather their contemporaries on the Continent, for, up to the present moment, we have never, as a general rule, made a proper classification of our sick),—generally found it indispensable to make some classification in their Hospitals, and most especially to separate their Surgical from their Medical wards—an arrangement insisted upon by Howard as a *sine qua non* in Hospital Management. We have evidence of the fact that *they dared not do otherwise*; that they were compelled, by a dire and urgent necessity which could not be overlooked or evaded, to adopt a system of separation, when they found that,—where persons with Wounds were placed with Typhus and Dysentery cases in crowded, filthy, ill-ventilated wards,—scarce any of the Surgical Patients recovered. When three-fourths of the Surgical Cases would be swept away by sphacelus, and matters came to such extremity that Pouteau,—smarting under the recollection of the Hospital Gangrene which he had contracted in the poisoned air of the great Hotel Dieu Hospital at Lyons,—demanded *"are Hospitals more pernicious than useful to humanity!"* the necessity for some classification of their patients forced itself upon their notice.

Again, when some classification was adopted,—crowding, dirt, and fœtid air being still in the ascendant,—Hospital Gangrene still reigned in the Surgical Wards; Puerperal Fever was endemic in the Obstetric Wards; and, in the Fever Wards, Typhus, acquired concentrated malignity, and often spread through the house, and beyond it, as a pestilence.

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disorder. The Royal Hospital, at Plymouth, consisted of ten separate buildings, allowing of a classification of the several disorders "in such manner as may best prevent the spread of contagion."

Under Sir James Macgrigor's directions, during the Peninsula War, wherever a station was fixed on for a General Hospital, it was ordered that a separate Hospital, or Building, should be established for the reception of Continued Fever, where cases of Dysentery might, likewise, be sent, if they were not numerous, and a separate building could not be obtained for them. A separate Hospital or Hospitals were established for Surgical Cases; where, likewise, all cases of Chronic Disease and of Intermittent, might be placed. A Convalescent Hospital was established most commonly without the walls of a town; the convalescents being divided into classes, according to their degree of convalescence. The convalescents were, weekly, removed from the convalescent wards of the different Hospitals to the Convalescent Hospital; and no man was sent from the Convalescent Hospital till he was judged to be fit for all the duties of a soldier. From the Convalescent Hospital, when fully recovered, a man was sent to the Depôt, which was under the charge of a Military Officer, the Commandant; and, here, he did some duty and remained until discharged and sent to join his Regiment.

When, later, whatever cleanliness mere scouring, dusting and polishing,—what M. Levy termed "*cette coqaetterie de lustre et de propreté,*"—could effect, and what was then considered tolerable ventilation, were universally introduced in Hospitals, it was found that Surgical and Typhus patients could be spread through the general wards without immediately self-evident and invariably inevitable ill consequences. It may have been that those who had undergone capital operations, and were placed in wards with some twenty sick, (as was the case, some years ago, in most of the London Hospitals, and as appears to be so still,) were liable to suffer a good deal from the various types of what Astley Cooper, Travers, and their pupils, called "Constitutional Irritation" and 'Irritative Fever," but which was termed by Abernethy Surgical Fever, and is now generally known by that name. Still, usually, what was deemed a fair proportion of them recovered. On the other hand, no one who watched any of these wards long, (as I had an opportunity of doing for nearly twelve years continuously) will forget that, on certain memorable occasions, Typhus spread in the house, attacking the nurses, the pupils, and the surgical patients; that a gaping, if not a sloughing stump, now and then, presented itself; that cases of pyæmia frequently occurred; and that the appearance of an erysipelatous blush was always dreaded, in dressing the "breast cases."

It is not too much to assert that we have allowed Surgical Fever and Erysipelas to take the place of Hospital Fever and Hospital Gangrene, among our patients, in our over-confidence in an imperfect system of Hospital Sanitation.

A outburst of Endemic Gangrene, in what we consider our healthiest and best-regulated Hospitals, from time to time, affords us a terrible insight into the evil which is there permitted to be imperceptibly, but unceasingly at work.

It is a remarkable fact, of very serious import to our sick and wounded, that, of late years, the Regulations of our Military Services have ceased to make adequate arrangements for the proper separation of patients in Hospital.

In India, Medical Officers have, usually, endeavoured to separate their Surgical from their Medical cases, and to classify their other patients, as far as the nature of their hospital accommodation would permit of. Separate apartments are, generally, available for cases of contagious disease; but the Medical Regulations of the three Presidencies are silent upon the most important subject of Ward Classification.

An imperfect system of this kind is laid down in the *Regulations for the Management of Army Hospitals at Home and Abroad of* 1855*.

The admirable Medical Regulations of H. M. British Hospitals of 1859, are absolutely silent upon this most vitally important point,—except that they demand that "In all Hospitals, wards should be set apart for Convalescents, when practicable."†

I am firmly convinced that,—sanitate as much as may, rendering our wards absolutely immaculate—to the eye—, and making the air within as pure as the air without, which in cities and malarious countries is only a step towards perfection,—we shall never be quit of the danger of Surgical Fever until we make proper arrangements for the segregation of our Surgical Patients.

I believe that, a few years hence, the Statistics of the Results of certain Classes of Surgical Operations, performed in Hospitals, will be most carefully collected, to be received as valid tests of the comparative healthiness of these Institutions.

To become practically useful to this end, such data must be most faithfully, but still most cautiously selected and with very judicious discrimination. Trivial minor operations, which are followed by Surgical Fever, should be carefully noted. Every appearance of Erysipelas and Hospital Gangrene should be scrupulously recorded. Operations on the skull, and for malignant disease, and hernia, the ligature of large arteries, lithotomy and secondary amputations, as well as amputations through the thigh,—as being all fraught with almost unavoidable dangers,—scarcely afford a fair criterion. It can hardly be questioned that, carefully sifted, primary amputations, on account of, exclusively, local injuries are, in many respects, the best to judge by,—as, *prima facie*, occuring in the healthiest class of patients. Still, to render the results, thus obtained, applicable to our purpose, the cases should be scrupulously arranged into certain classes which, naturally, present themselves as being attended with greater or less shock to the nervous sys-

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* "From the first establishment of a Regimental or Depôt Hospital, the Medical Officer in charge is to make a proper classification of Diseases in the respective wards, and to treat similar diseases in contiguous beds."

"Patients with infectious diseases, as Fevers, Fluxes, Small-pox, or Measles, shall be kept separate from patients with other complaints," &c.

"Men with Itch are, if possible, to be placed in a separate room, or in a tent, when the season will permit." *Paras.* 16-17-18, pp. 13-14.

† Section VII., para. 6, page 40.

tem. Gunshot wounds, involving large arteries or joints or both, wounds from grape or round shot, from explosions of gunpowder, railroad accidents, the evulsion of limbs by machinery, shark, tiger, and alligator bites, those resulting from the fall of walls, rocks and the like. Those consequent upon falls in mines, from scaffolds, and in docks. Those injuries which have been followed by slight or excessive Hæmorrhage &c. &c., The constitution of each patient and the condition of his principal viscera must also by carefully estimated.

Our present statistical data, regarding the Results of Amputation, are tolerably extensive. Until lately, it was considered an invidious task to compare the statistics of operations in our surgical hospitals; and it was felt that, to assert that St. Sepulchre's was not so fortunate in its lithotomy cases as Saint Faith's was,—to adopt the words used by the insulted Surgical Staff of a St. Sepulchre's in 1844,—"to show that the" (unfavorable) "results are attributable to the bad surgery of the Medical Officers, or to an unhealthy site and bad general management." Now, however, the Profession throughly understand that, while good surgery must always be, *cæteris paribus*, more successful than bad, the death statistics of the operations of the most skilful surgeons do not differ greatly from those of the least adroit; and that,—from the circumstances of their being situated in the midst of large manufactories, near a railroad or docks, or of the surgeons being extremely careful and successful in saving injured and diseased limbs,—the best hospitals may lose an unusually large proportion of their amputation cases. And, however the Governors and Treasurers (a class who have generally guarded the reputations of their institutions as they would the credit of a bank) may view the matter, our Hospital Surgeons have long ceased to be unwilling to see the whitewash taken off St. Sepulchre's, and to allow the dead mens' bones and all uncleanness, within, to be freely thrown open to the light,—fully recognising and feeling most acutely the influence of the "unhealthy site and the general bad management" of the place (over which they have no control) in frustrating their best skill and in destroying their most hopeful patients.

Hence, we have a good many reliable data to assist us in forming a standard upon which the healthiness of a hospital may be, in some measure, estimated by the results of the amputations performed therein. The varying results displayed in the following table—(in compiling which I have been

greatly indebted to the kindness and research of Dr. Fayrer Professor of Surgery, and Dr. T. Burton Brown, of the Calcutta Medical College)—speak for themselves. It has become the practice to report the Results of Operations at various London and Provincial Hospitals annually, in the Medical Journals;—a comparative table of this kind with very full explanations of the causes of death and of the circumstances which, in the opinion of the Surgeons, rendered the operations at each hospital more or less successful, would, undoubtedly, exert a most usefully corrective influence.

When we are told,—as we were some years since, by Mr. B. Phillips,—that "in some hospitals, the mortality, after amputation has exceeded 53 per cent; that, in several, it has not exceeded 12 per cent, and that in one of the number, out of twenty amputations, there has been only one fatal result; that, again, in the hospital where the mortality had been represented by one in twenty, it was, afterwards, represented by four in twenty; and that, in the institution in which the mortality was fifty three per cent, it became reduced to thirty one per cent;" when we are shown, by Professor Sczymanowski, that the average mortality of thigh amputations in the Dorput Clinic, Prague, is 38 per cent; and that it was 100 per cent, in the Polish and Mexican Wars; and when we learn, from Dr. Burke, that in 80 primary amputations, at Bhurtpore, all recovered;—we cannot but perceive that the law of Nature is, that healthy men, properly treated and lodged, have a fair prospect of recovering from amputations, and that the degree in which that prospect is abridged affords us (under careful discrimination) a useful gauge of the healthiness, 1st of the Hospitals, and 2nd of the classes admitted to them for treatment.

Hospital.	*Authority.*	*Amputations.*	*Deaths.*	*Per cent.*
Liverpool Infirmary,(up to 1843.)	Halton.	43	3	6·97
Leeds, Infirmary Teale's Operations, 1855-58.	Teale	56	7	12·67
Seventeen British Provincial Hospitals, in 1859.	Medical Times and Gazette. .	149	33	22·14
Massachusetts and Pennsylvania Hospitals	Hayward & Norris.	137	31	22·62
The Dorput Clinic Prague, 1812-1857. ..	Szymanowski.	110	25	22·72
University College Hospital, up to 1841. ...	Polter	140	32	22·85
St. Thomas's Hospital 1835-40.	J. F. South...	54	13	24·07
Twenty English and Scotch Provincial Hospitals in 1858. ...	Medical Times and Gazette. .	134	33	24.62
Guy's Hospital, up to 1859.	Bryant	300	75[?]	25·
Northern Hospital Liverpool		73	20	27·31
British Armies and Ships, 1780-1840 ...	R. Alcock.	1318	390	29·60
Glasgow Infirmary 1794-1838	Lawrie. ...	176	100	36·
Crimean War...	M'Leod. ...	...	...	40·37
Calcutta Med. College Hospital, 1851-59 ...	Drs. Fayrer & Brown.... ...	93	38	40·86
Leeds Infirmary, ordinary amputations, 1855-58	Teale.	24	10	41·66
Military Hospitals in Portugal and Spain (British Legion), 1836-7...	R. Alcock. ...	109	55	50·45
General Collection ...	B. Phillips ...	613	313	51·07
Parisian Hospitals,1835.	Gendrin. ...	43	23	53·48
Hotel Dieu Paris, 1836-42.	Malgaigne. ...	527	285	54·07

In Lower Bengal, the ordinary fever which is produced by wounds, in natives, almost invariably, assumes a periodic character, and is amenable to the influence of quinine. I have always found that milk-fever takes on this character in respectable East Indian women, and I have observed the same in several English ladies, long resident in Bengal, whom I have attended. We have, already, seen how frequently child-bearing proved fatal in Calcutta formerly, when the endemic fever of the place was a deadly remittent; and how seriously an intensely malarious atmosphere has been found to imperil parturient women in other localities. Although Surgical Patients in India, whether European or Native, are liable to suffer from all those forms of lesion,—erysipelas, phlebitis, pyæmia, thrombosis, purulent arthritis, and the like,—which are common in British and Continental Hospitals, these sequelæ are, here, generally among the rarer secondary causes of death after operations and injuries, the great majority of cases proving fatal by low forms of Dysentery and Diarrhœa—the endemics of the country.

The writings of Macgrigor* and Guthrie† abundantly show how strong a tendency Malarious Fever, Dysentery, and Hospital Gangrene had to run together among the wounded of the Peninsula Campaign, which lay chiefly in districts of Spain and Portugal, where ague was then so common that "the inhabitants did not term it a disease."‡

The often-recognised fact that Surgical Patients recover with difficulty in places where marsh miasm is rife, has, of course, great importance in India.

In giving,§ in 1813, an account of St. Thomas' Hospital, Sir Gilbert Blane describes it as situated on a track of ground

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* *Sketch of the Medical History of the British Armies in the Peninsula of Spain and Portugal, during the late Campaign.*—Medico-Chirurgical Transactions, Vol. VI., 1815.

† *Commentaries on the Surgery of the War in Portugal, Spain, France, and the Netherlands*, 1853.

‡ Mr. Stafford has recorded an observation which, as coming form a London observer, affords us a very important link connecting the Surgical Fevers of India and Europe. He says—"Ague very frequently occurs, from local injury, when the patient has, previously, had an attack of it. An injury of the urethra is a good example of this,"—with which we are all acquainted—but headds, "I have seen the Irritative Fever, attendant on accidents, run on into Intermittent Fever". A remark which, as far as I am aware, has not been made, elswhere, as the result of observations in England.

§ *Observations on the comparative Prevalence Mortality and Treatment of different Diseases,&c. &c.* Medico Chirurgical Transactions, Vol. IV., extended in *Select Dissertations:* page 115.

which was, originally, swampy, and no doubt aguish.* The situation being flat, and in the midst of a pretty close population, the perflation is not so perfect, nor the external air so pure, as would be desirable in choosing the site of an Hospital. In ten years, 192 cases of Intermittent Fever were admitted in Blane's wards alone; he, however considered that these were not, principally, from the local population. There were, formerly, near 500 beds; but, about thirty years previously, when he was elected, febrile infection prevailed so much, that his two immediate predecessors and one of the surgeons, besides several of the menial attendants, had died, in the course of the preceeding year, of fever caught in the Hospital, upon which the number of patients was reduced, and new methods of cleanliness and ventilation were adopted.† Iron bedsteads had been, previously, brought into use. In consequence of these precautions, "no medical attendant had since been affected with the Hospital Fever, nor could he ascribe more than three or four deaths of nurses and patients to this cause, during the whole time of his incumbency." He remarked that, "besides the generation and retention of infectious matter from defective ventilation, recoveries, in all classes of patients, are retarded by impure air. This is especially remarkable with regard to severe injuries and the capital operations of surgery."—"The like remark," he added, "might be made with regard to lying-in women and children." and that "without pure air, the purposes of such institutions would be entirely frustrated"‡ South§ speaks of sloughy

* The whole of this tract is still, essentially, malarious.

† To understand this condition of St. Thomas's Hospital thoroughly, the Reader should have been in the habit, as we were, of visiting the low dark wards, on the ground-floor of the old building, some five and twenty years ago. They were perfectly clean and tolerably free from hospital stench, what Pouteau termed the *mauvais air quon respire dans les grandes Hôpitaux*,—but it seemed as if the load of Misery on the upper floor, crushed them down and compressed their atmosphere. Although I did not then know what they were when Blane first saw them, I, at once, understood, why, Mark Akenside could never enter them without spitting.—The author of the "Pleasures of Imagination" was cut off, in the prime of life and the height of his fame, in 1770, by a "putrid fever" or a "putrid sore throat. He was not, of course, one of the unfortunate predecessors to whom Blane refers."

‡ One of Sir Gilbert Blane's remarks must be quoted here, although it is, at first sight, strongly opposed to the argument which we maintain. Fever cases appear to have been always most freely admitted at St. Thomas's—"I have been told," he says, "that there are hospitals in which it is a rule not to admit fevers. It is difficult to conceive what idea the authors of such a regulation could form of an hospital, as a benevolent institution, the end of

§ Translation of Chelius.

stumps as, now and then, occurring at St. Thomas's "perhaps more frequently during those years, formerly, *when our wards were much troubled with Erysipelas.* The operation

which is the alleviation of human misery. Most probably, the dread of introducing infection gave rise to it. If so, I beg, most confidently, to assure them, from very extensive experience in the Public Service, that fevers, brought from the most infected situations, become quite innocuous to those who approach them, provided care is taken, immediately on their admission, to cleanse their persons by stripping and washing them, and cutting off their hair, and provided the hospital is as well ventilated as St. Thomas's has been for many years."—His own report, however, although not including Surgical cases, affords a clear insight into the fact that Surgical Fever was then rife in the wards of St. Thomas's Hospital,

The same remark has been frequently repeated. Dr. Thomas Hancock observes (in his *Researches into the Laws and Phenomena of Pestilence*, &c. 1821) that, in the year 1819, a very intelligent physician, connected with one or two Fever Hospitals in Dublin, during the Epidemic, assured him he had seen no proof of the existence of contagion in the disease, as it appeared in those institutions under his care, where very great attention was paid to ventilation, &c. and where the patients were not inconveniently crowded. Soon after this, he was informed that, in the course of about four months, between 2 and 300 persons were admitted to the Belfast Fever Hospital, and they were, frequently, so crowded in the wards, as nearly to cover the floor with their beds; in which case, although the building was new, airy and well regulated, the matron, 22 nurses and the apothecary took the disease; yet it was so mild that scarcely more than one in fifty died.

In his History of the Epidemic Fever in Bristol, Dr. Pritchard states that the Medical Wards in St. Peter's Hospital, there, were very small, and it was necessary to place the beds very near to each other, and to put too great a number of patients in a given space. Though all possible attention was paid to cleanliness and ventilation, offensive smells were often perceptible, and it was under these circumstances that the disease was manifestly contagious. The wards of the Bristol Infirmary were lofty and well ventilated "Here also the fever patients were dispersed among invalids, of almost every other description, but no instance occurred of the propagation of fever"—(did every wound and ulcer heal as it ought to heal, were there no instances of protracted recovery from ordinary disease?)—"none of the nurses were attacked, nor were the patients lying in the adjacent beds, in any instance, infected; though cases of the worst description of Typhus Gravior were placed promiscously among the other patients, scarcely two feet of space intervening between the beds."

We concur with Professors Gregory and Alison and Miss Nightingale in recognising fully the truth and value of the great principle which these facts establish; but we cannot accept it as *a reason* or a justification for placing Typhus, Surgical and other patients together in the same wards, it can only be received as *an excuse* for this dangerous practice, in Hospitals where the Medical Officers have not the means of properly classifying and separating the sick and wounded. That, in the present state of our hospital arrangements, we are not justified in thus placing, in the midst of our sick, a caged pestilence which is ever on the point of brusting forth, every medical man possesses abundant evidence, none more distinctly to the point than the fact adduced by Miss Nightingale,—that, between the years 1848-57, Fever and Cholera occasioned nearly 50 per cent. of the total mortality among the matrons, sisters and nurses of fifteen London Hospitals; the death rate from these diseases, among the London female population, being only 16 per cent.

would either seem to be going on favorably for two or three days, the patient comfortable and adhesion in progress, when a sudden change would set in; the stump become painful, swollen, hard, and red, the ununited part become sloughy; or, the stump never making any attempt at union, but soon becoming painful, swollen and sloughy. In either case, the patient, himself, hot, dry, flushed with brown tongue and foul alvine discharges, the pulse quick, irritable, delirium and death supervening.—I said such cases occurred, perhaps more frequently when erysipelas was rife; but they really do happen where no erysipelas is in the ward at the time, nor has been for many months".

Fifteen or twenty years ago, this was, certainly, the termination of a great many of the amputations performed in the Borough Hospitals.

In describing the defects of the Calcutta Presidency General Hospital, to the Committee on Municipal Enquiry in 1840, Dr. McLeod, Inspector General of Hospitals, Queen's Troops, stated that—"Within a few yards of the East end of the Regimental Hospital are two tanks, which have often been complained of, as the source of Intermittent Fevers, and it is worthy of remark that several of the earliest cases of this type of fever, which appeared in the Cameronians last year, affected patients who were in hospital for other diseases, and when the disease was not prevailing at all in the Fort."

On this occasion, Sir Ranald Martin cited Dr. Hennen's description of an Hospital at Abrantes, where the "low, flat, moist olive-ground, occasionally overflowed by the river," caused stagnation of the air, especially in the morning, when the whole locality was "enveloped in a dense fog," which, in addition to fevers of the remittent types, caused extreme un-

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Miss Nightingale maintains that, if infection exists, it is the effect of carelessness. We have already suggested that, in the highest sanitary sense, we believe this to be perfectly true; but how, in the present condition of our Hospitals, are medicalo fficers to prevent this "carelessness" which ranges down from the carelessness of the injudicious architect, to that of the suffering and ignorant patients? True, fresh air dilutes the fever poison. A square foot of arseinuretted hydrogen gas which, inhaled by an individual, would probably destroy life, is not perceptibly noxious when diffused through the air of a lecture room; still, self-evidently, it impairs the purity of that atmosphere. We must not place our sick, especially our surgical patients, in wards throughtout the atmosphere of which fever and other poisons are finely disseminated. It is our duty to remove them beyond the influence of all known poisonous agents, of the possible operations of which, upon debilitated systems wherein great works if reparation have to be effected, we have but little certain knowledge.

healthiness in all the wounds, frequently terminating in hospital gangrene. Hennen observed the same untoward results in Brussels, after the Battle of Waterloo, where the soldiers occupying the "Petit Chateau," situated among the stagnant waters and filth of the town, afforded all the most troublesome cases both of Intermittent Fevers, and of those of a Typhoid Type, both seriously aggravating the effects of wounds.

Having thus reviewed, with unavoidable conciseness, the general *Outward Influences*, which predispose the sick to suffer from Nosocomial Diseases, we come to notice those *States of Constitution* which predispose individuals to become the victims of such maladies, especially after Operations and Injuries.

We need not, in this stage of our enquiry, dwell much upon the nearly self-evident influence of a *Scorbutic Tendency* in developing this class of diseases. The possibility of the existence of this most dangerous constitutional defect should, however, never be lost sight of by medical men in India—whether in the Hospitals of European or Native Troops, or in Jails, or in civil practice among the poor or the rich. In time of war, Scurvy is always liable to become developed in our Indian armies,—hence much of the severity of many of the diseases which attend and follow War, even where Hospital Grangene is not developed,—Fevers, intractable Venereal and other Ulcers, Diarrhœas, and Hœmorrhagic Dysentery. Further, there are certain extensive tracts, in India, where Scurvy is always endemic, and where it finds expression in the development of a very remarkable class of diseases,—of which more will be said hereafter. Until lately, our European Soldiers, and the Prisoners in our Native Jails have never, as a general rule, obtained sufficient supplies of fresh antiscorbutic vegetables of the wholesomest kind:—the increase of Soldiers' and Jail Gardens is but slowly remedying this evil. Scorbutic poverty of the blood, if not fully developed scurvy, occurs most readily in a malarious country, like the upper and the lower plains of the Bengal Presidency and Pegue, among people poorly fed, mainly upon vegetables deficient in antiscorbutic elements. In this country too, I believe that many Europeans, in affluent circumstances, become the subjects of a diseased state of the system, partly scurvy partly malarious anæmia,—generally developing itself in Dysentery,—either from being afraid to eat wholesome and seasonable fruits and vegetables, or from, insensibly, getting out of the habit of doing so.

Whenever a spanæmic or any chachæmic state of the constitution is present, ten fold is added to the danger of every wound. In old times, Surgeons and Obstetricians were accustomed to consider it a curious fact, that a large proportion of those patients who lost most blood in capital operations, and those women who flooded most after delivery suffered from consecutive inflammations of the most intractable and deadliest character,—not observing that irrepressible hæmorrhage is the clearest expression of a thinned or poisoned condition of the blood.* It has always been known that there is a class of anæmic persons who, in the absence of any minute investigation of their conditions, are said to be the subjects of a "hæmorrhagic diathesis"—who are placed in imminent peril and sometimes die from irrepressible bleeding from a bitten tongue, a lanced gum, a leech-bite or a cut finger;—every surgeon who has lived long in very malarious districts has seen something of this kind.

This is an influence of very widely spread operation in Lower Bengal—probably nowhere more so then among the poorest classes of natives in the vicinity of Calcutta. Sir Ranald Martin, long ago, observed that, in the victims of malarious cachexia,—"a wound or trifling abrasion which, at another time, would escape notice, now becomes a foul and sloughing ulcer, owing to the depraved state of the blood:—hœmorrhages arise from slight causes—sometimes spontaneously; and, so altered in the state of the blood, from want of red particles apparently, that, when performing operations of immediate necessity at the Native Hospital of Calcutta, he always became aware of the presence of splenic disease, on making his first incision—the hue of the blood being demonstrative of the fact."†

I had only too many opportunities of seeing such marsh-poisoned subjects, (who are frequently the subjects of sloughing cornea, and among whom cancrum oris, not unfrequently, occurs quite spontaneously, without the use of mercury, in adults) in that excessively malarious district Chittagong. In amputating the thigh of a poor boatman, whose leg and knee had been frightfully crunched by an alligator, I found that, after every detectible artery had been promptly secured, thin venous-looking blood continued to oose from the whole

* It is now a matter of general observation that, whenever puerperal, fever is prevalent, severe hæmorrhages, after labour, are remarkably frequent.

† Op. citat., page 285.

of the cut surface. None of the usual means would control this draining which, though not in any great quantity, never ceased until the patient became collapsed, and sank in about two hours after the operation.

In the present state of our knowledge, it is unnecessary to do more than allude to the self evident facts, insisted upon by Hawkins, Villerme and others, that the mortality rates, in Hospitals, are liable to be increased in times of national depression, in seasons of scarcity, and at times when large numbers of operatives, in manufacturing towns, are thrown out of employ; and that, as has been observed in Paris, the mortality of the various patients, in Civil Hospitals, is considerably influenced by the comfort or poverty of their condition, by the amount of their wages, and the nature of their work.

Again, where patients have fatty or granular Kidneys, or fatty or kirrosed Livers—Uræmia, or Cholæmia—the extraction of a tooth, the slipping of the bandage from a recently opened vein during sleep, or a little scalp wound, involving an imperceptible temporal branch, may, as I have myself known, cause death from rapid uncontrollable draining away of the whole circulating fluid.

In some situations, especially in large English cities, particular classes of Visceral Lesions are so generally prevalent, among the poorer inhabitants, that the diseases which follow operations and injuries assume certain highly characteristic and distinctive pathological characters.

Guy's Hospital stands in a district where, within a small compass, there are, probably, more brew-houses and gin-shops than anywhere else in the world; and where besides the gin-bibbing masses, a large proportion of the patients belong to classes notorious for their intemperance,—always exposed, in following their occupations, to severe atmospheric vicissitudes and, consequently, peculiarly liable to renal and hepatic diseases,—Brewhouse Draymen, Bargemen, Costermongers, Bakers, low Publicans, and their Potboys, &c. &c.

In 1843,—when an observation, by Dr. Thomas Hodgkin, that he had noticed mottling of the Kidneys in two patients who had died after the operation of lithotomy, "*and in others who had sunk after operations and injuries*; and a remark, by Mr. Charles Aston Key, that he had scarcely ever seen a fatal case of lithotomy, in which there was not discovered organic disease of some of the abdominal viscera, and more especially of the kidneys, constituted nearly all the data upon which we could trace, with any directness, the association of Surgical Fever with

Blood Disease,—I had observed,* in the dead house at Guy's Hospital, that the morbid characters presented by the serous surfaces and other structures together with the appearances of the effused fluids, &c., in those who died of acute internal inflammatory attacks consequent upon operations or injuries (especially where the primary wounds were at a distance from the parts afterwards involved), almost invariably, bore a precise resemblance to those which so characteristically distinguish the inflammatory affections of the same parts which are known to result from Bright's disease of the kidney :—and, where this had been the case, I had seldom failed to discover that there had existed, at the time of the patient's death, some form of disease of the kidneys sufficiently intense to have interfered greatly with the proper action of those glands, and, thereby, to have been capable of setting up a disposition to the occurence of fatal mischief in the serous surfaces, or in other important structures.

It was, at the same time, observed that, in our British Metropolis, and, probably, in most of our densely-populated towns, there is a very large class of individuals in whom excessive labour, constant exposure to extreme changes of temperature, intemperance, and, not unfrequently, the action of syphilis and the abuse of mercury, have produced such a generally diseased condition of the system that its powers of reparation, after injury, have become almost entirely destroyed. It will, indeed, happen that these individuals are, for a long time, enabled to follow their ordinary avocations without appearing to suffer much inconvenience; but,—so soon as they become the subjects of any injury, as a contusion, a fracture, or even a slight puncture or laceration, any surgical operation, sudden loss of blood or, in short, any depressing or exciting influence which tends to unsettle the precarious balance upon which their vital functions have long trembled, and to produce increased derangement of their organs of circulation and elimination,—they, almost inevitably, become affected with acute inflammation, of the most deadly kind, in some one or more of the great cavities of the body; scarcely one of the serous or mucous surfaces being exempt from a chance of becoming affected. This state of the system which was, then, so often spoken of under the vague

* *An Inquiry into Certain of the Causes of Death after Injuries and Surgical Operations in London Hospitals, with a view to their Prevention.* Guy's Hospital Reports, 1853 page 78.

term "cachexia" is, I held, usually, clearly traceable to a morbid condition of some of the principal organs of nutrition and elimination; the kidneys, liver, or spleen have long been either in a state of confirmed disease, amounting to disorganization of portions of their structures, or have, for a lengthened period, remained in a condition of such intense functional derangement as to be continually liable to fail in their actions upon the induction of any state of unusual constitutional excitement. Large numbers of patients of this kind come under the Surgeon's care, and there are grounds for believing that it is mainly owing to such conditions of the principal viscera as have been described above, and not to the severity of the mechanical injury or to any fault in the mode of operating that a large proportion of the deaths from internal inflammation, after accidents and surgical operations, generally occur,—apart from the influence of locality, bad air, confinement, climate, season, the prevailing state of the atmosphere and the like outward circumstances.*

I noticed that it was impossible to have been long in the habit of paying close attention to the pathological examinations, in one of the large Metropolitan Hospitals, without observing that a very great proportion of those who die from the secondary effects of mechanical injuries, have been the subjects of some marked, and often very acute form of Renal, Hepatic, or Splenetic disease, or of the whole of these combined. For the purpose of confirming the observations, which I had made at Guy's Hospital for several years previously, I carefully examined the accounts of all the cases were death occurred from the secondary effects of operations, and mechanical injuries of every description which had been entered in the Post Mortem Registers of the Museum during the preceding 15 years (1827-42), comprising the whole of the cases in which

* In his essay on Temperance, cited above: Dr. Carpenter gives the following striking examples (from Indian experience) of the influence of abstinence from alcoholic stimulants, in conducing to rapid recovery from severe surgical inquries. He says "Mr. Havelock, in his narrative, in reference to the wounded after the victories in India, observes:—" The Medical Officers of this Army have distinctly attributed to their previous abstinence from strong drink, the rapid recovery of the wounded at Ghuznee. "And Mr. Atkinson, in his work on Affghanistan, is more explicit—stating that, 'all the sword cuts, which were very numerous, and many of them very deep, united in the most satisfactory manner which we decidedly attributed to the men having been without rum for the previous six weeks. In consequence, there was no inflammatory action to produce fever, and interrupt the adhesion of parts."

examination of the bodies of patients, so dying, could be procured during that period.

One hundred and fifty-three cases of the kind were obtained from that source. Many of the subjects of these reports had undergone severe operations, or suffered from extensive accidental injuries; others had been the subjects of wounds or contusions of an, apparently, very trivial kind; still, the internal inflammations which destroyed life, in most of the latter cases, were generally as severe as those which proved fatal in the former instances, and frequently more so.

In these 153 cases, death took place from inflammation of secreting surfaces, or internal organs (excluding the Kidneys, Liver, and Spleen) in ... ... 134.

In the remaining 19, the patients died from other causes; such as Tetanus, Sloughing, Gangrene, Hæmorrhage, Suppuration, Erysipelas, Diarrhœa, and total deficiency of reparative action in the wound; and, in one of these cases, the precise cause of death could not be discovered, ... 19.

153.

In but a small proportion of the above 134 cases (in which the injuries or operations were followed by the occurrence of fatal internal lesions), were the inflammatory affections found to be confined to a single organ or secreting surface; but it was generally noticed that several important parts, and these often at a considerable distance from each other and from the seat of injury, had become equally involved.

The following is a list of the various recent inflammatory lesions which were found to have occurred in the above 134 cases:—

Acute disease of the substance of the Lungs, appearing in the form of inflammatory œdema red or grey hepatization, abscess, or gangrene, was noticed in	47 cases.
Bronchitis alone	2 „
Pleuritis	35 „
Laryngitis and Diphtheritis	2 „
Meningitis	27 „
Inflammation, softening or abscess of the Brain	9 „
Pericarditis	14 „

Peritonitis	52	cases.
Arteritis and Aortitis	4	„
Phlebitis	3	„
Inflammation of various portions of the Intestinal Canal (excluding cases of Hernia)	9	„
Suppuration in the substance of the Psoæ Muscles	0	„
Acute purulent Synovitis	1	„
Inflammation of the Tunica Vaginalis ...	1	„
Cystitis	8	„
With regard to the state of the Kidneys, Liver and Spleen, I found that the Kidneys were in a state of disease, either presenting remarkable congestion, softening, mottling, or the granular or cystiform alterations in	72	cases.
The appearances of the Kidneys were not mentioned (usually from the examination having been only partial) in	44	„
These organs were stated to be without any apparent disease in	26	„
The condition of the Kidneys was doubtful in ...	11	„
Total ...	153	„

Of the above cases, in which the Kidneys were either not examined, found healthy, or considered in a doubtful state, there was marked disease of the Liver or Spleen, or of both these organs, in 21 cases—giving a total of 93 cases, in which one or more of these important organs was found in a state of lesion. It was observed that, of the 134 cases in which the patients died of Internal Inflammations, there was also superadded marked disease of the Kidneys, Liver, or Spleen, or of all these organs combined in 90.

In rather a large proportion of these cases, the disease of the Liver, Spleen and Kidneys had, evidently, existed for a very considerable time previous to the patients receiving the wounds or injuries which became the apparent primary causes of death; but, in very many (and this was especially observable in the renal cases) the changes were, evidently, of so recent a nature, as to render it probable that, almost immediately after the operations or accidents, either visceral disease had been roused from a latent to an active condition, or that a state of acute congestion had, suddenly, been

established in organs which had, hitherto, been suffering merely from chronic degeneration.*

I took these facts as strong grounds for insisting upon *the necessity of carefully examining into the condition of the Principal Abdominal Viscera, and most especially of the Kidneys of every patient admitted to the Surgical Wards of our Metropolitan Hospitals.*

The immoderate use of ardent spirits is so general among the poorer classes of that Metropolis, and the almost inevitable consequences of that practice, organic visceral lesions, so frequent that, in scarcely any individual, whether the subject of accidental injury or spontaneous disease, can it be safely presumed, until the state of the secretions has been carefully examined, that the principal abdominal viscera, the kidneys more especially, are in a sufficiently sound condition to enable the patient to be subjected, without immediate hazard, to a surgical operation, or even to any very active course of medicinal treatment. Where renal disease exists, the commonest fracture may prove fatal, the slightest puncture become the cause of deadly inflammation, the simplest and most ably performed operation be rendered abortive ;—and yet it is highly probable that, in such cases, a timely discovery of the real condition of the viscera, the use of such remedial mea-

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* In February 1859, Mr. Bryant read a paper, before the Royal, Med. Chir. Society, containiag an analysis of 300 cases of Amputation collected from the records of Guy's Hospital. The results are of great interest, in connection with the above details. Twenty-five per cent. of these operations were fatal—30 per cent. of the lower extremity, 10 per cent. of the upper. Pyæmia was the cause of death in 42 per cent. of the fatal cases, and in 10 per cent. of the whole number amputated. Exhaustion was the cause of death in 33 per cent. of the fatal cases and in 8 per cent. of the whole number amputated. The following causes of death were operative in the annexed proportions :—

	Of Total Cases.		Of Whole Number.
Secondary Hœmorrhage	7· per cent.	or	1·66 per cent.
Thoracic Complications...	5·6 „		1·33 „
Cerebral...	3· „		·66 „
Abdominal...	1·4 „		·33 „
Renal...	3· „		·66 „
Hectic	3· „		·66 „
Traumatic...	7· „		1·66 „

It will be observed that these results do not agree, numerically, with my statistics, especially in the proportion of renal cases. A fuller analysis of the cases of Cerebral, Thoracic and Abdominal complication and also of those of secondary Hœmorrhage is needed. Had the subjects of these accidents healthy abdominal viscera ? I apprehend that reference to the Post Mortem Records would prove that a very large proportion of them had not.

sures as are generally found available in allaying renal irritation (by relieving the kidneys, as much as possible, from the duty of active secretion), and the temporary postponement of operations, where the nature of the cases would admit of delay, until the unhealthy action in the diseased organs had, in a great measure, subsided, might, in a large proportion of such cases, be the means of avoiding the most disastrous results. It is to be feared that the more confirmed forms of renal disease never undergo a complete and permanent cure; but it cannot be doubted that, during the earlier stages of the affection, while the glands are still merely in a state of great vascular turgescence (a period, by the bye, at which I believe inflammations of the serous membranes to be especially liable to occur), the disease is, certainly, amenable to remedies; and although, where there is reason to suppose that the kidneys have undergone a permanent structural change, every injury is attended with considerable risk to the patient, it is well proved that, even then, the disease of these organs may be rendered passive and kept down, the urine being, for a time at least, restored to its natural character. Under these circumstances, operations may not be productive of such certain danger. I have seen cases of patients suffering from stone at Guy's Hospital, where, some weeks previous to the operation, the urine had been albuminous; but, this condition having yielded to remedies, lithotomy was performed, and the patients recovered without any marked bad symptoms. There can scarcely be a doubt that, in these cases, an operation, undertaken while the kidneys were in an irritable state, would have been, unavoidably, fatal.*

I insisted that it is impossible to urge too strongly the necessity of, invariably, taking the precaution of examining the state of the liver and spleen, and testing the urine for the presence of albumen, in each patient, before deciding upon the performance of any surgical operation; and of postponing such operation, if possible, while either of those organs appears to be enlarged, or the slightest trace of serum is detectible in the urine.

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* This remark was not sufficiently full. In stone cases, the urine may be albuminous, (even when the presence of blood is not evident on superficial examination) in consequence of mere vesical irritation. In judging of these cases, the specific gravity of the urine, and the presence or absence of tube casts, afford our safest criteria.

There can be little doubt that the great success which attends operations for stone, in the Upper Provinces of India, is mainly attributable to the comparative infrequency of renal disease among the Natives.

Occasionally, renal disease may remain undiscovered by this test; for it is unquestionable that extensive granular degeneration of the kidney may exist, in a passive form, without indicating its presence by albuminous urine; but, in such cases, the Surgeon must be free from blame, after having taken the usual precautions for detecting the disease. I suggested that, even where the urine has been found healthy immediately previous to the operation, there is still great necessity for testing its condition, at intervals of a few hours, during a considerable time after the patient has been removed from the operating table to his ward; for the extremely recent appearance of the morbid changes observable in the kidneys of many of those who have sunk from internal inflammations after injuries has (as I have already stated) led me to believe that these organs often remain with merely a tendency to derangement until the disturbance, consequent upon the operation, causes them, suddenly, to take on a state of active disease.

In instances where the kidneys and other viscera are known to be in an unhealthy state, but where, in consequence of accidents, hernia &c. an operation cannot be postponed, it will still be left with the Surgeon to use every means in his power, both before and after the operation, to render the patient's state as little dangerous as possible, by endeavouring to relieve the kidneys and other abdominal organs from congestion and over-action. And, even in patients in whom there is no evidence of the existence of visceral disease, the Surgeon cannot be too careful in his precautions against its establishment, both before and in consequence of operations, wherever the aspect of the individuals or the history of their general habits renders it propable that they are, in any degree, liable to the occurrence of such disorder.

Little can be said with regard to the management of the inflammatory affections of serous and other structures which occur in these cases; the fact of their generally proving fatal, despite of all remedial measures, is the strongest argument that can be adduced in advocating the adoption of measures, for the prevention of their attacks.

I insisted that it must be borne in mind, that the above conclusions were the results of observations made in one particular locality, and among a class of patients whose previous modes of life may be supposed to have been, upon the whole, of a nearly uniform character. The remarks would, I believed, apply generally to patients treated in London Hopitals; but it was not to be inferred that they were, therefore, expected

to hold good with regard to the causes which produce death after operations, &c., in all other situations. In no two countries, and perhaps in no two cities of the same country, will precisely equal degrees of mortality, after injuries and surgical operations, obtain: the respective number of deaths and the nature of the several fatal cases will be liable to endless variations, dependent chiefly upon the previous modes of life of the patients and the situation and arrangements of the hospitals which they occupy. Many of the causes which produce fatal results, after operations or accidents, in Parisian Hospitals, may scarcely have any effect in determining the safety of patients admitted to our Metropolitan charities. The peculiar habits which render the artisans of most English manufacturing towns liable to suffer from inflammatory affections in consequence of wounds (being far less prevalent in many parts of the Continent) must, there, have a proportionably slighter influence in producing similar effects. The causes of the fatality of operations performed upon soldiers in field Military practice, are, certainly, for the most part, distinct from those which prevail among the inmates of the greater number of Civil Hospitals: and, indeed, differences in the situations of two infirmaries, in opposite quarters of the same town, may determine a far greater proportion of deaths to one than to the other. In one, the vicinity of a confined district, rife with unhealthy exhalations, may be exerting a destructive influence: in the other, a more open and elevated situation may render its occupants entirely free from the effects of such noxious agency. The same remark will, in a less degree, hold good even with regard to different wards in the same building. I, therefore, urged that the above observations were intended to apply chiefly to the causes which, during a long series of years, had led to fatal results, after operations and injuries, in Londoners of the poorer classes, the inmates of a Metropolitan Hospital, in which the air and ventilation were tolerably good, where secondary fever and the worst forms of erysipelas were not prevalent in the surgical wards, and where, in fact,—as I then considered,—the chances of death after operations, &c., appeared to depend almost entirely upon the previous state of each patient's constitution.*

* I believe that facts have never been collected, upon a sufficiently extensive scale, to afford us the statistics of surgical operations performed in private practice, Such an enquiry involves the question—are the subjects of organic visceral disease as much exposed to the danger of

Subsequent experience of other Hospitals, as well as the subsequent history of that Institution itself, have caused me to lower the estimate which I formed of the sanitary capabilities of Guy's, eighteen years ago.

We are now told* that the double wards of Guy's Hospital "are only fit for medical cases." These are wards, placed back to back, in the new part of the building, with which I am not acquainted. What were termed the "Lower Wards,"—a building on three flats, (the middle of which was, then, the male venereal ward) each flat being divided into two parallel wards freely communicating with each other,—never appeared to be thoroughly ventilated, and always smelt "musty." There hung, continually, about them a compound odour of dinner, and linseed meal poultices and an indescribable *tertium quid* not always so intense as the stench of Dante's Lazar House,—"such a stench as is wont to issue from decayed limbs,"—but still very oppressive and sickening. None but surgical cases, principally ulcers, were treated there,—those requiring capital operations were always removed to Luke's ward, in the upper building; but I recollect more than one case of fatal surgical fever after minor operations, and many of erysipelas and of slow recovery in the Lower Wards.

In a discussion at the Medico Chirurgical Society, in March 1859, Mr Spencer Wells, in commenting upon the large proportion of cases of amputation in which, according to Mr. Bryant, death occurs from Pyæmia in amputations performed at Guy's, enquired whether the deaths, from this cause, were more frequent in the new than in the old building. The method of ventilation, in the new portion of that Hospital, was not one that he should like to see generally carried out. The Hospital Smell was very oppressive, and the air was hot and dry, conditions which he considered likely to favor the increase of pyæmia. Mr. Birkett said that they had no surgical

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surgical fever, when operated upon in their own well-ventilated houses, surrounded by every comfort that wealth and good taste can obtain, as are the poor, of like constitution, in Hospital. Such facts as we have go far to show that no amount of perflation with pure air is a certain safeguard, where the viscera are in a diseased condition; but there cannot be a doubt that, *cæteris paribus*, a vitiated atmosphere will always interfere with recovery. The, doubtless, highly injurious effects of the practice of resorting to the metropolis and other large cities to have surgical operations, performed should be fully taken into account, in forming this comparison.

* Mr. George Godwin.

cases in the new wards, at present, and pyæmia cases were almost unknown in them,—death had, certainly, taken place from pyæmia in one or two cases of simple wounds.*

Since the above remarks, have been in print, I have learnt from a gentleman who was there at the time, that, in October 1853, an outbreak of Hospital Gangrene occurred at Guy's—a calamity which happened in University College Hospital in 1841, and, to a very limited extent, in the Middlesex Hospital in 1835. My friend informs me that the first four cases occurred in Naaman ward,—in the old or upper building. At the same time, a case occurred in Luke's (the ward in which patients who have undergone capital operations are placed) and another in Samaritan, the ward above Naaman.

The discharge pipe of the privy of Samaritan ward passed close to Naaman ward. It was noticed that the first two cases of Gangrene occurred at the further end of Naaman near the water closets. Subsequently, a tower was built, beyond the outer wall of the Hospital, the water closets and discharge pipe being placed in that building. The disease did not recur.

I shall make no apology for dwelling thus at length upon the "pathology" of this Hospital, as the place fairly represents a very large number of old fashioned, ill constructed Hospitals, in Great Britain and elsewhere, in which no amount of mere cleanliness will compensate for radically bad structural arrangements; where, consequently, the most insidious forms of nosocomial disease are constantly generated; and where the causes upon which the endemic Irritative Fever, Erysipelas, and Pyæmia depend only require concentration to give rise to outbursts of Hospital Gangrene.

Whether the above remarks upon the importance of recognising the existence of Visceral Disease in Surgical Cases have received any practical attention, of late years, I am not aware; but I must candidly confess that,—although I, naturally, looked very keenly for the result during the five years which I, subsequently, spent in nearly daily attendance at the great hospital in whose Reports they were published,—I did not find that the very simple and easy precautions which they suggest were attended to in the surgical wards. In saying this, I feel confident that those who know me will not accuse me of reflecting upon the Surgeons of that Institution,—all men who deserve to be ranked

* Was not this an aggravating circumstance ?

among the most eminent in the Profession, more than one of their number being still among those whom I most honor and love,—I attribute the fact to the tardiness with which truths, promulgated by young observes, were formerly and perhaps are still accepted. I recollect to have gone, some years after the publication of the memoir in question, into a dead house, in which the post mortem examination of a patient who had died after an operation for strangulated hernia had just been concluded, in time to hear the Surgeon tell his pupils that death had resulted from peritonitis,—the usual cause of a fatal issue in cases when it is found necessary to open the sac. I held then, as I still do, that operations for hernia have no tendency whatever to cause peritonitis in persons whose viscera are healthy and who, otherwise, enjoy fair opportunities of recovery.* And,—noticing that the copious inflammatory effusion from the whole peritoneal surface was sanguinolent and, otherwise, of that appearance so characteristic of inflammations of uræmic origin,—I searched for the kidneys, found them undisturbed, and saw, at a glance, that they were diseased in an extreme degree. It is not probable that the early recognition of this fact, which must have been patent during the patient's life, would have availed to preserve him. Still it would have materially served as a guide to both treatment and prognosis.

Briefly to resume,—Contagious Fever, Cholera, and other Zymotic Diseases spread or are introduced into Hospitals; or they, as well as Hospital Gangrene, are generated within the walls. The sick, lodged there, experience, in the highest degree, all the disadvantages of marshy or otherwise malarious localities, and of a town atmosphere.

We have the strongest grounds for believing that the essential predisposing cause of Surgical Fever is a *deteriorated condition of the blood*, which may be either a constitutional Spanæmia produced by want, exposure, and fatigue, as in trying campaigns, or a poisoned state of that fluid, (of which the patient is generally the subject when admitted into Hospital), such as exists in Scurvy, in its deve-

* Many years ago, and some time before I published my observations upon the influence of Visceral Disease in causing death after Surgical Injuries and Operations, Mr. Thomas Wilkinson King called attention to the fact that strangulation is especially liable to occur in the herniæ of those who are in declining life, and in individuals who are the subjects of disease of the abdominal viscera, attended with obstruction to the caval and portal circulation.

loped and, still more frequently, in its latent forms, in those long exposed to marsh miasm, in the victims of Secondary Syphilis and Mercurialism, of Drunkard's Dyscrasia or of Cholæmia or Uræmia in Hepatic and Renal Disease;—or a Cachæmia or Zymosis, acquired while under treatment, occasioned by the absorption of some toxic agent, in breathing the air of an over-crowded and ill-kept Hospital, rife with decomposing animal exhalations from diseased bodies, malignant or sloughing sores,* foul dressings and excreta, or contaminated by adjacent drains, burial grounds, knackeries, tan-yards or dissecting rooms† or introduced into the general circulation from some diseased limb or surface. Under this last category we would place the Surgical Fever which occurs in the subjects of neglected or injudiciously dressed

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* Harty notices the coincidence of Hospital Gangrene and Puerperal Fever in the Hotel Dieu, and mentions the fact that, at a time when Hospital Gangrene prevailed in the Surgical Wards of the Royal Infirmary at Edinburgh, Puerperal Fever raged in the Lying-in-Ward immediately adjoining to them. He notices that the Lying-in-Hospitals, of Dublin, were frequently molested by Puerperal Fever so long as strict attention was not paid to ventilation and cleanliness, and that the disease seldom appeared, in its contagious form, in private practice; and when it did, it was in a far milder manner.

Zimmerman made a statement of great significance to Medical Officers in India. He observed,—"when Hospitals are filled with Dysenteric people, some of the assistants are attacked only with the Dysentery, and others with the Jail or Hospital Fever."

A striking fact, related by Dr. Brereton, carries the train of morbid causation still another step further. This authority states (*Dublin Journal of Medical Science*, vol. VI.), that, in the temporary *Fever and Dysentery* Hospital, in Raven Street, Dublin, in 1826 and 1827, although the wards were extremely well ventilated and large,—on paying his daily visit, he "observed one of the patients who had been admitted with Fever, some days previously, to be formidably attacked with Erysipelas. On the following day, he found the patient in the next bed seized with it. On the third day two patients, in the adjoining beds, were similarly attacked. He then became seriously of opinion that the disease was contagious, but resolved not to have those already affected removed until he tried the result of another day. On the following morning, he found three more in like manner labouring under the disease; and, what made it more remarkable, they were all similarly attacked in the head and face. He had them immediately put into another ward, where there were no" (*Dysentery and Fever*) "patients; they all recovered, and no more Erysipelas afterwards appeared."

† Mr. Spencer Wells recently noticed, (*Medical Times and Gazette*, March 5th. 1859,) that he had been informed, when at Strasburg, a few months previously that, at the Hospital there, the mortality from Pyæmia was very considerable in those Wards which were immediately over the dissecting room; and that, after removing all the operation cases to the opposite side

wounds as well as the ill results which so often follow secondary amputations for severe injuries, and those performed where gangrene is spreading, in both of which latter cases the circulation is loaded with the products of what it is now customary to term "destructive assimilation."*

The Reader, interested in the most important subject of Hospital Diseases, will do well to consult an admirable article, on the "*Site and Construction of Hospitals*" published in the British and Foreign *Med. Chir. Review* for April 1860.

We shall now give, as concisely as the importance of the subject will allow, a review of the desiderata and evitanda of Indian Hospitals, with especial reference to Climate, Position, Site, Aspect, and Construction.

Climate.—Under this head, we may, advantageously, take into consideration the fact that, in India, there are many situations where apparently very trivial injuries,—abrasions, scalds, contusions,—are liable to degenerate into Ulcers of the most intractible character, and even into Hospital Gangrene. It is principally within and near the tract of the Indian Desert, from Aden, upwards through Scinde to Mooltan, that these forms of disease are almost constantly met with; but we have grounds for believing that there is not any portion

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of the building, Pyæmia had almost disappeared. This fact, he believed, might throw some light upon the same class of cases in English Hospitals, and might justify the objection which the Governors of our old Hospitals had to the proximity of the dissecting rooms to Hospitals.

The above fact is supported by Brugman's statement that, when Hospital Gangrene raged in one of the lower Wards at Leyden in 1798, the patients in the Ward above, remained free until the Surgeon had a hole made in the ceiling which divided them, with a notion of ventilating the lower Ward. Within thirty hours, three patients in the Ward above, who lay nearest to the opening, were attacked with Gangrene.

* I believe that no attempt has been made to enquire into the influence of Cancerous and Tubercular Dyscrasia in determining the occurrence of Surgical Fever. Ordinary observation shows that many patients, operated upon for Malignant Disease, recover nearly as well as persons in sound health, and that a very large proportion of those whose limbs are amputated for Strumous Articular Disease recover with scarcely a bad symptom. Still the statistics of these operations are a great desideratum,—as there is blood disease in either class of cases. I find,—on taking, almost by chance, the statistics of 50 amputations for *Disease*, performed between 1855 and 1858, mostly in the Leeds Infirmary, given in Mr. Teale's Work on "*Amputation by a long and a short rectangular flap*,—that 7, or 14 per cent., died of Strumous Disease, generally Phthisis, at the following periods after the operation—10, 14 days 1, 7, 10, 12, 14 months.

of our Indian possessions in which they may not and do not, from time to time, become developed.

This is not the place in which we can enter into more than a brief a review of the History of *Aden Ulcer*. To those who have not observed the disease on the spot, its history is open in several memoirs.* Without making himself acquianted with these, it is almost impossible that a Surgeon,—whether in charge of European or Native Troops, and even more especially of Native Prisoners,—can form a just idea of the nature and treatment of the various forms of obstinate Ulcer, tending to Hospital Gangrene,† which are likely to come under his notice, during the course of his Indian experience. Whoever will carefully compare the History of Aden Ulcer with that of the "Malignant Ulcer,"—so prevalent in our Royal Navy at the end of the last century, as described by Gillespie and Blane, but most fully in Trotter's Medicina Nautica,—will, I feel assured, recognise them as one and the same disease modified, as might be expected, by climate and other self-evident circumstances.‡

Dr. A. Campbell, who gave an account of the cases of certain sepoys treated for this disease at the Marine Battalion Hospital, Bombay, in 1839, states that the most trivial

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* *Annual Report of the* 1*st Regiment, Bombay European Infantry, stationed at Aden, by J. Howison Esq. Bombay Medical and Physical Transactions, No.* 3, *for* 1840, *page* 82.

Report on the cases of Aden Ulcers received into the Marine Battalion Hospital, Bombay, 1839, by A. Campbell, M. D. *Ibid,* page 84. *Notes sur la plaie du Yemen, &c. Dr. Chedufay, Ibid, page* 94.

Statistical Report of the Jamsetjee Jejeebhoy Hospital, Bombay: Dr. Peet, Ibid. for 1851, page 174. *Report of the Native General Hospitals (Civil and Military) at Aden, for* 1853-54, *by* J. F. Steinhausen, Civil Surgeon. *Report on Aden Ulcers* by the same: In the Bombay Medical and Physicial Transactions for 1855. Also *Annual Report of the Sick of the Engineering Department at Aden, for* 1856-57, by Sub-Assistant Surgeon Ruttonjee Hormusgee. *Ibid.* 1860. *Notes on Aden Ulcers compiled from Official Documents. Ibid.* 1859.

† Several authorities place the class of Ulcers which we are about to describe in the same category with Hospital Gangrene. A close study of the subject, will, however, I believe, lead to the conviction, that the diseases are, although closely allied, distinct from each other, and that the most practical observers have maintained this distinction. Under unfavorable circumstances, however, the Malignant Ulcer has, nearly everywhere, shown a proneness to degenerate into true Hospital Gangrene.

‡ Some of the Naval Surgeons, whose reports Dr. Trotter gives, appear to have distinctly recognised the resemblance between the "Malignant Ulcer" of the Fleet and Ulcers which they had observed in the East Indies; and Trotter regarded a long residence in warm climates as one of the predisposing causes of the Malignant Ulcer of the Fleet.

scratch was speedily converted into an extensive phagedæna advancing with most fearful rapidity, in spite of the remedies employed. The character of all the sores was nearly similar. They were, for the most part, extensive and ill-conditioned, with raised, ragged, and discoloured edges, the natural colour of the skin preventing the true livid appearance from being detected. The surface was, in most cases, covered with by a reddish brown sometimes grey slough, mixed with clots of blood, raised considerably above the level of the surrounding integuments, and, in two cases, projecting so as to assume the appearance and character of a fungous growth. On the separation of these sloughs, some of which were remakably tough, tenacious, and firmly adherent, the disease was found to have penetrated to a considerable depth, involving all the textures, and exposing the different structures, as nicely dissected as if they had been prepared for anatomical demonstration. This appearance of extreme depth was, however, somewhat deceptive, as the effusion into the subcutaneous cellular tissue tended to thicken and raise the skin, and made its surface appear much higher than it really was. The sores were exquisitely tender, and the slightest touch was followed by an oosing of blood, more or less considerable. A thin, acrid, bloody serum seemed to take the place of healthy pus, and the fætor from the sore was intolerable. All complained of burning pain in the sore, invariably aggravated at night, when their suffering was truly distressing, requiring the strongest narcoties to induce sleep, or a remission of their tortures. The limbs, to a greater or less extent, were swollen and tense to the feel. The colour of the skin prevented the detection, with precision, of the ecchymosed patches, a peculiar feature in this disease, which was established by subsequent appearances on dissection. This tenseness of the limbs seemed to be a source of much irritation.

The constitutional disturbance, in general, was in ratio to the size, extent and intensity of the local affections. In some cases the gums were spongy and sore; in others, a peculiar metallic taste in the mouth was complained of; in one case, in which the scorbutic taint was strongly marked, and who died from Scorbutic Dysentery, pain, bleeding from the gums, and looseness of the teeth, were prominent symptoms. All the patients complained of pains in the limbs, back, &c.; and, in the more severe cases, great restlessness, and a countenance denoting most distressing, suffering and anxiety were visible.

In general, the pulse was weak and stringy, tongue clean, and bowels, for the most part, regular; slight diarrhœa occasionally supervened, but easily yielded to ordinary remedies. The disease progressed rapidly, involving muscles, bones, and tendons; and, in several instances, large portions of tendons sloughed off.* This and other accounts show, that the disease rarely shows itself except on the lower extremities, and it commonly attacks the anterior part of the leg, down to the foot and heel.

Surgeon Craig, the Medical Superintendent of Aden, observing the cases of this disease, which occurred among the Biggaries in the Military Native General Hospital at that station, in 1856, was particularly struck with the damp floors and damp stones of the Wards (some rain having fallen about this time). The entire place, he says, had a sickly appearance; and the atmosphere might be more easily imagined than described. He suspected that Hospital Gangrene was the cause of the mortality among the Biggaries, and he, therefore, determined to remove the sick from Hospital and place them in tents, on elevated ground near at hand, sending only the favorable cases on board ship for passage to Bombay; the very slight cases to their lines, and retaining only the worst, *viz.*, all those in which the Ulcers were sloughing. At this period, the weather was unfavorable, being cold and damp, with boisterous wind. Nevertheless, nine days afterwards, no fresh Ulcer case had been admitted, the Ulcers which had not put on a sloughing appearance were doing well. Upon the whole, this measure answered well; although its success was far from complete, some of the patients being in an advanced state of disease. Dr. Craig remarked that, not only at that time, but also in a previous outbreak, he failed to discover any evidence that patients were admitted into Hospital with Ulcers in a sloughing state. *Sloughing comes on after the patient has been some time in Hospital.* In corroboration of this statement, he notices that the wives and children of Sepoys and Biggaries never suffer from Aden Ulcers, and he thinks it fortunate that "no Hospital accommodation has ever been found for them."†

* Further accounts of the characters and progress of these Ulcers, have been given by Mr. Steinhausen, in the articles cited above.

† It is here very note-worthy, that in his *Outline of the History and Cure of Fevers*, Dr. Robert Jackson remarks, "Blotches on the skin and sore legs freequently appear in crowded Barracks, in Ships, or Hospitals; they depend, evidently, upon a cause of febrile contagion, but the precise state or degree

The following is Dr. Craig's summary of what he considers to be the Nature and Cause of the Aden Ulcer. "By the end of the long hot season, to the debilitating influence of which Sepoys on duty and Biggaries at work are much exposed, from the scanty supply of fresh vegetables, of which, even when procurable, they grudge the expense, and, probably, somewhat owing to the scanty supply and bad quality of the water,—the natives of India become more or less enfeebled and, in many cases, tainted with Scurvy, Ulcers, therefore, from whatever cause produced, are slow to heal and gradually accumulate in Hospital. It, unfortunately, happened for the Biggaries, that the hospital was imperfectly ventilated, badly situated, immediately on the high-water mark, each receding tide leaving an extensive surface of mud, mixed with much decaying marine animal matter, as formerly pointed out by Dr. Steinhausen. The floors of the Hospital were damp, sufficient of itself, in cold weather, to convert healthy Ulcers into foul; and, in my opinion, the main cause of the evil:—the walls, constructed of matting, acting as a sponge for sucking up putrid and other unhealthy emanations, becoming, in the end, a focus of infection. A number of Ulcer cases, being thus crowded together, is, of itself, sufficient to keep them from healing, from it being impossible to keep the air pure; any one of them taking on a sloughing action or from the admission of such one into Hospital, like leaven, soon affects the whole mass; so that, in the same ward, may be found sores of all different degrees of intensity, from the indolent flabby up to the worst gangrenous ulcer. To use a simple comparison, the small spark becomes a fierce flame, a raging furnace which it is no easy task to extinguish. By stopping, however, the supply of fuel, and, if possible, scattering the embers, the fire, however large, will gradually die out."

We trace out a nearly similar history of the Malignant Ulcer of the Feet in Trotter's Reports. It affected some ships more than others, and the sick bays more than other parts of the ships. Wherever the cases were much accumulated, more cases were likely to occur from the slightest injuries, and the Ulcers became sloughy and intractable. Where the cases were

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of contagion, which originates this form, is difficult to be marked; this appearance, however, usually shows itself in an early state of contagion,—in a contagion generated among a set of men rather than imported from a concentrated source."

thinned out, recovery among those who remained was much accelerated.

It is especially note-worthy that all who have observed the Aden or Yemen Ulcer enter into the question of its *scorbutic origin*—the same question continually arose in the minds of the Naval Surgeons, who are our authorities on the subject of the Malignant Ulcer of the Fleet. Both diseases are shown to have arisen in men who were considered to be generally well fed, but who were subjected to trying duty and great exposure, and who, certainly, were not adequately supplied with antiscorbutic vegetables. One of the earliest reporters on this Ulcer, Mr. Howison, of the 1st Bombay Europeans, observed that it had, hitherto, not affected Europeans, in a single instance. This has been confirmed by Steinhausen, though it is a general and, he thinks, well-founded opinion, there, that wounds and sores are much more tedious in healing at Aden than in India. The Portuguese, at Aden, are also as free from these Ulcers as the Europeans.

At this station, Venereal Disease is rife; it is not described as being remarkably intractable; but it is noticed that syphilitic complication, necessarily, renders the Aden Ulcers less amenable to treatment.

Mr. Howison notices that Dysentery is a most formidable disease at Aden, both as respects its frequency and its dangerous character. It is, he considers, precisely similar to that of the coasts of India generally; but, at Aden, a particular relaxation and torpor of the constitution act unfavorably on the patient, and, at best, much retard his convalescence and final recovery. Nearly all who have since written upon the subject concur in describing the Dysentery which prevails at Aden as a very formidable disease.

The fact that *Hospital Gangrene and Malignant Ulcer are liable to occur in association with the worst forms of Fever and Dysentery*, is one of great importance and significance to Surgeons, especially in India. Harty observes that different authors have noticed it.* Thus Webster, in his Treatise on Epidemic Diseases, mentions that, in Italy, in the year 1694, "the Spotted Fever, and, in some places, Dysentery, were very mortal; wounds degenerated into Ulcers, and blisters were followed by Mortification, which proved fatal to many. Thus, too, it is mentioned of a plague at Venice, that it absorbed all other disorders in its pestilence—even wounds and Ulcers. He also refers to

* *Observations on the Simple Dysentery and its Combinations, &c.*

Ramazzini's 40th Chapter,—*de Morb. Castren.*,—in which Barnstoff—who attended the German Armies, during five years campaigns in Hungary,—a country at that time noted for the great fatality of its disorders,—mentions that Malignant Fevers, Dysentery, and Wounds constituted the chief diseases of the Army. After speaking of these two former, he states, of the latter, that the slightest wounds, and all those attended with contusion of the parts, particularly when on the head, however, trivial they might be, inflamed and fell into Gangrene. The like has been observed in many other long-protracted sieges.

We have, already, said that the chief prevalence of this class of diseases is in the Desert Tract, so well described by Dr. Kinloch Kirk, throughout which true Scurvy is constantly endemic among the poorer Natives, and where European troops have always been liable to the incursions of this horrible disease, both in its masked and in its developed forms. Mr. Steinhausen tells us that, among the most common diseases of Aden must be reckoned Scorbutus. Why this should be the case, he considers it difficult to decide; but the fact is incontestible, however obscure the reason. Brackish water and a deficiency of vegetable food, combined with the influence of sea air, may, to a certain extent, explain the cause of the prevalence of this cachexia, which the exhausting effect of the climate, probably, favors; but fresh water and vegetables are very liberally supplied by Government when required;* and native vegetables—(are they of the antiscorbutic kinds?)—are freely brought into camp, and are always to be obtained, at as reasonable a rate as at most of the stations in India. Yet Scurvy is more frequently met with here than in India, and in an infinitely more severe form.

Kinloch Kirk showed that the great characteristic of the Desert Tract, especially of Scindh, is its impregnation with saline matter similar to what is obtained by the evaporation of sea-water. Everywhere that a well is dug, the water is bitter and brackish. Throughout Scindh, Scurvy is very prevalent; and, here, both Natives and Europeans are liable to suffer extremely from an Ulcer of this class, known as the

* Are not these always indispensable? It was, in like manner, found that, when patients suffering from the Malignant Ship Ulcer were brought into harbour, and supplied with an abundant ration of the finest vegetables, the sores often did not improve,—the constitutional taint had become ineradicable.

Scindh Boil. According to Kirk, Sloughing Sores, terminating in Ulcers and Fistulas, are everywhere common in that district; and, among the Natives, it is astonishing to find these old sores among healthy, stout men who have no other [visible?] ailment. He remaked that,—*while these cachectic diseases are present, operations, even of a minor kind, should never be performed.* At Shikarpore, Kirk describes Boils and Ulcers as being very prevalent. The sore came in various ways, originating in a small boil, in erysipelas phlegmonoides, or in a red surface which secretes a dry scab. One European Officer and several Sepoys had sores commencing in circumscribed eczematous spots. Mr. Kirk does not appear to have attributed these conditions to Scurvy.

According to this authority, one of the severest forms of Bowel Complaint, prevalent in Scindh, is a colliquative purging of mucous matter which, he considered, is incorrectly supposed to be Dysentery, usually consequent upon Fever. Lime juice proved the most effectual remedy.

In a recent tour of inspection to *Dugshaie,* Deputy Inspector General of Hospitals Dr. Bruce found a party of European Soldiers, in the Convalescent Depôt, some of whom were evidently suffering from the form of slow ulcerative disease described above. They had all extensive superficial Ulcers, either on the face or extremities, indolent in their nature and indisposed to heal. These are said to commence with a small tumor under or of the skin, which is succeeded by a scaly state of the surface which becomes detached and shews the Ulcer below; there does not appear to be any collection of pus. These men were all brought sick from Mooltan.*

* When Inspector General of Hospitals, Dr. Campbell Mackinnon, visited Mooltan, in the month of January 1859, he found Scurvy very prevalent in the wing of the Bombay Fusiliers stationed there. He examined every man himself. Out of a strength of 392 men present on parade, he picked out 105 men whose spongy readily bleeding, and, in some cases, ulcerated gums gave evidence of the disease. They had been stationed at Aden where Scurvy is endemic. Thence, they had accompanied the expedition to the Persian Gulf, whence they were sent to Scindh and Mooltan. Thus they had served, of late, altogether in districts where Scurvy is more or less prevalent. Dr. Mackinnon learned that, at Mooltan, during the hot weather, the chief or only vegetable supplied to the soldiers, in their rations, was onions. The men became so tired of them, at last, that they threw them away; and thus, during a considerable part of the hot season, they were without vegetables at all. Dr. Mackinnon added that vegetables do not appear to be much grown in the Mooltan district. The district itself, within the influence of irrigation from its canals, is a productive one. It gives much sugar and indigo, but it, absolutely, does not raise sufficient grain for its own consumption, the inhabitants import it from elsewhere. He could not learn that Potatoes were cultivated at all. Scurvy is more or less endemic in the district.

They were reported scorbutic but, in Dr. Bruce's opinion, they were not so. The gums were in no degree affected, and there was none of the langour and debility that attend scorbutus. In short, they presented the exact appearance of the Ulcers that used to succeed the Scinde Boils which he has seen resist months and years of judicious treatment, while the patients' general health remained unimpaired. Dr. Bruce was convinced that the state of constitution whence these Ulcers result is widely different, in its effects, from all he had seen of scorbutic affections. Lime juice, potatoes, oranges, or diet of any description, appear to have no beneficial effect on this disease.

Allied to this affection is the *Delhi Boil* or Aurungzebe,* As recently described by Surgeon Fraser, of H. M.'s 88th Regiment, and by Assistant Surgeon Tomkyns, and Sub-Assistant Surgeon Ashootosh Gooptu, in their Reports of the Delhi Dispensary. The Delhi Boil has been known to be peculiar to that city, as far back as authentic history can trace. The Emperor Aurungzebe having been one of its victims. Its existence is confined principally to Delhi; being less common in the surrounding district; and, at Meerut, about 40 miles off, it is unknown. The 88th Regiment arrived at Delhi in the month of February 1859. In June, the men began to be affected with troublesome sores, which appeared in different parts of the body. These were found to be most intractable, resisting all treatment, and the number of men affected became greater as the season advanced. From June 1859 up to July 1860, the date of this report, as many as 114 soldiers, and many of the officers, women and children, had had Delhi Ulcers.

The disease is described† as beginning by the gradual formation of a reddish patch, raised and hard in the centre, over which the skin, at first smooth and shining, puts on a scaly appearance, becoming fainter towards the border of the spot. In the centre, is a small pimple; after a time, a brownish crust forms which is somewhat more depressed than the surrounding surface; it becomes gradually larger, particularly if pricked or

* Surgeon Frazer in the *Indian Lancet*, July 15th, 1860.

† Sub-Assistant Surgeon Ashootosh Gooptu describes it as commencing as a papular eruption. At first, there is an eruption resembling mosquito bites; these, after a few weeks, coalesce and form an irregular reddish patch, which remains, for months, without being troublesome; but, sometimes, violent itching, with a sensation of smarting accompanies the eruption. The patch, occasionally, assumes the character of an abscess which gives way by several small openings.

irritated, and it is accompanied by pain and, sometimes, a troublesome itchy soreness. While this is going on, the surrounding skin becomes of a shining light purple colour, and scaly, gradually becoming fainter in scaliness and colour as the distance from the centre is increased. If the crust is removed, a raw irregular surface is observed, which bleeds freely, if roughly handled. It secretes, sometimes, a thin transparent or greyish brown fluid; this cakes on the surface and forms the crust, and the ulcer goes on spreading. It is, usually, of an irregular circular form, but presents itself in all shapes. Sometimes, a thick crust, of a greyish white colour, forms and the ulcer underneath it is smaller, and has not such a tendency to spread as in the brown-crusted variety. This, however, may arise from its being less picked at and irritated by the patients themselves. The raw surface consists of flabby, irregular, fungoid-looking granulations which appear more luxuriant in the centre, and are tender to the touch. When kept clean and dry, the ulcer very quickly forms what appears to be a new skin, beginning in the centre and extending to the edge, but it seems as if it could only advance to a certain distance, for a raw watery line of demarcation separates it from the surrounding tissue. The centre is now hard and dry, like parchment, and pressure discovers that it has nothing adherent to it underneath. If this is removed by a poultice, the raw surface is observed to be depressed in the centre and secreting the thin peculiar fluid which, if left alone, would form the thick, brown, dirty-looking crust, with a well-defined watery line of demarcation between it and the sound skin; becoming, if the sore is situated on a part that admits of much motion, a deep sulcus. When the ulcer heals up, it leaves a cicatrix depressed in the centre with raised and slightly indurated edges, and a purple scaly surface. It soon breaks out again, accompanied by the appearnce of some new ones in another place. These ulcers are more common on the upper extremities and face than on the lower limbs, and are more rarely observed on the trunk. While they are in progress, no traces of constitutional symptoms are observed. In some, the gums are pale, in others, morbidly red, and the alvine evacuations and urine present no unusual appearances.

Dr. Frazer and Sub-Assistant Surgeon Gooptu differ with regard to the season at which this disease is most prevalent. The former shows that it commenced in his regiment in June, and that the greatest increase in the number of cases

was from December to March. The latter says that its greatest prevalence is during the hot season.

Dr. Frazer notices the similarity of this disease to that which we have already described as prevalent at Mooltan and in Scindh.

The natives agree in considering that it arises from the use of the water of Delhi, which is impregnated with saline salts. Dr. Frazer is inclined to adopt this hypothesis. Change of air—leaving Delhi—appears alone to have the power of eradicating this disease from the system.

Conjecturing that this endemic tendency to ulcerative action might have given some manifestation of its operation among the wounded at the siege of Delhi, I made enquiry of Dr. Brougham, whose valuable Memoir on the Surgery of the Delhi Campaign must be familiar to all Surgeons in this country. Dr. Brougham, however, informs me that they had not a single case of Delhi Ulcer in their Hospital. They were equally free from Hospital Gangrene. Not a single case of what he considers Hospital Gangrene occurred. Abscesses might form, and stumps might not heal by the first intention, but he never had a case of gangrene among the many treated, except as the result of direct injury. Very many cases of Surgical Fever occurred.

In our remarks on the unhealthiness of Delhi, we have, already, described the obstinate Bowel Complaints which there arise, apparently in a great degree in consequence of drinking the brackish water of the wells.

Gwalior has its endemic Ulcer. In his Report of the 3rd European Regiment for 1858-59, Surgeon Crozier mentions that, although there are several spacious tanks in the Fortress, capable of supplying a large force with water, their water is never used, as it is considered by the natives unwholesome, and the cause of the Phagedænic Ulcers which were so prevalent amongst the Sepoys of the late Contingent who were located in the fort, for different periods, within the last fourteen years. Mr. Crozier has seen a leech bite, a blistered surface, the wound resulting from a simple surgical operation, become a severe Phagedænic Ulcer which required great management, and the application of the concentrated nitric acid. For some time, Government was put to great expense in keeping up a large establishment of bheeties, or water carriers, to carry up water from a great distance below. This practice was continued till the time of the mutiny of the Contingent, and it is again in operation.

Dysentery is common and severe at Gwalior, but I do not find anything in the Reports which distinguishes the endemic of that place from those of other localities.

In fact, as my friend Dr. T. W. Wilson* has remaked,— "Every locality in India seems to have its Ulcer."

In an account of Dorundah, Chota Nagpore, Dr. Dunbar† states that Ulcers of a severe and dangerous kind occur among old and debilitated subjects, chiefly in the rainy season. The slightest scratch or cut becomes, in such persons, a foul and gangrenous sore, requiring the strongest remedies. The same kind of sore, he adds, is, not unfrequently, met with among the prisoners of the Jail at Kishenpore, and he has heard it termed the Nagpore Ulcer, but there is nothing in it different from the sores met with among the sickly inhabitants of the Jails at Burdwan and Bancoorah.

Dr. Brougham, who was long stationed at Dorundah, tells me that the Dysentery of that part of the country is extremely unmanageable and deadly. At the neighbouring European station of Hazareebaugh, Dysentery is very prevalent, but not of an unusually severe type.

Surgeon Morton, of the 6th Bengal Europeans, informs me that, here, Syphilis is extremely rife and peculiarly intractable. Neither he nor Dr. Brougham has noticed any unusual prevalence of Ulcers at these stations.

Outbreaks of Sloughing Ulceration, generally immediately excited by chafing of the leg irons or of ill-fitted leather stockings, were, formerly, extremely prevalent in the Up-Country and Bengal Jails, and they still occur only too often, especially in the larger District and Central Prisons.‡

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* In this article, I am much indebted to a series of Notes on Scurvy, Hospital Gangrene, and Endemic Ulcers in India, which Dr. Wilson drew up, in *M. S.*, some years since; and which, with that spirit of liberality so general among the Profession in this country, he has allowed me to make use of.

† India Journal of Medical Science, vol. 3, p. 630.

‡ On the subject of Sloughing Ulcers, and Hospital Gangrene in Jail Hospitals and Native Corps, vide—*An Account of an Epidemic Malignant Ulcer, or Hospital Gangrene*, by J. Adam, M.D. (Native and European Troops at Hussingabad. Only one European was attacked.) Cal. Med. and Phys. Tran. vol. 3, p. 132.—*Hutchinson on Indian Jails.* (Bancoorah Jail), 2nd Ed., p. 102. *Report on the Treatment of Phagedænic and other Ulcers by Irrigation in the Hospital, 8th Regt. N. I., and in the Station Hospital, Dinapore*, by Dr. J. Sutherland, Indian Annals, M. S. No. viii., for April 1857, p. 471. *On the Treatment of Hospital Gangrene* by Dr. J. P. Walker, (in the Agra Central Prison) Ibid No. IX.

Dinapore has long been most notorious for its sloughing and hæmorrhagic Dysentery, and for the prevalence and severity of Syphilis.

Ranging with this disease, we have that terrible Sloughing of the Cornea,—the very disease which Majendie produced in dogs, by dividing the fifth nerve or by feeding them, exclusively, on non-nitrogenous food,—with which every Civil Surgeon in Bengal is so unhappily familiar.*

It may be stated, as a general rule obtaining nearly everywhere in India, but most especially in lower Bengal, that ill-conditioned and obstinate and occasionally, but more rarely Phagedænic or Sloughing Ulcers are extremely liable to occur, in consequence of any slight abrasions especially from the chafing of ammunition shoes, among Sepoys during the wet season, and that mosquito bites on the legs are apt to degenerate into troublesome sores in Europeans, especially in young persons recently arrived in the country.

For instance the monthly returns of the Regt. of Lucknow, and 70th Regt. N. I. stationed, respectively, at Barrackpore

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In his Report for 1858, Surgeon Herbert Baillie has given a very interesting account of an outbreak of Sloughing Ulcer and Hospital Gangrene among the convicts in the Great Jail at Alipore, near Calcutta. He states that, up to the end of April of that year, Ulcers and Sores, from the irritation of the fetters, were scarcely ever met with among the prisoners there,—an immunity which frequently struck him as singular, considering the distances from which prisoners arrived. The first case that occurred was that of a man from Patna, with a large Phagedænic Ulcer which nearly extended from the elbow to the wrist. He had been treated at Patna (where the disease had been prevalent—vide Dr. Sutherland's Report, Supra Citat,) for this ulcer. The destruction of parts was so rapid as to necessitate amputation,—the patient, eventually, sunk quite dropsical from Dysentery—the stump having all but healed. Several other cases of ulcer were received from different Up-Country stations. A separate ward, set apart for their reception, soon became insufficient to admit any but the worst cases. The disease, however, gradually abated, and the Jail was quite clear of it by the end of the year. There were treated 105 cases of common ulcer, and 39 of sloughing ulcer—none of which proved fatal. The cases of Hospital Gangrene numbered 49,—24 of which proved fatal. The greatest number of admissions occurred in July and September.

* In Bengal, this disease occurs chiefly in patients worn out by Jail Diarrhœa, perishing from sheer inanition, often without any manifest evidences of a scorbutic taint, although the presence of such a condition may be suspected. Dr. Gamack has lately, observed a form of it, in association with Scurvy, among the prisoners at Port Blair, Andamans. He observes, "Sixteen deaths are recorded amongst the patients admitted under Diseases of the Eye. These occurred from Scurvy or Diarrhœa, and it often happened that the scurvy patients became blind some time before death. A patient, in the advanced stage, would complain of violent pain in and around the eye; and, on examination, nothing could be detected but a slight haziness of the cornea; but inflammation would proceed so rapidly that, in 24 or 36 hours, the globe of the eye would become filled with pus; and, if both eyes were not affected at first, the other was almost sure to become affected after a few days. The sign was looked upon as fatal," [it is generally so in Bengal] "but two cases, which occurred towards the end of the monsoon, are still alive, and the men, although quite blind, are now well, and have become exceedingly stout."

and Allahabad, for the month of September last, show that, in the former corps, there had been 28 admissions for "Ulcers more or less severe" and that, in the latter and in the Cawnpore Levy, eight cases of Phagedænic Ulceration had been admitted during the month.

Again, proceeding to the South and Eastward, we find that, from Chittagong and Arracan and throughout the Straits Settlements, an inveterate form of Scabies is extremely prevalent. During the military operations in Arracan in 1825-26,* the pustular form of this disease frequently degenerated into obstinate sores, assuming a sloughing character. Upon the same occasion, Sloughing Ulcers became frequent during the rains. Their most usual situation was the foot. They often extended between the toes, burrowing deep among the tendons and, sometimes, under the plantar aponeurosis; but, more commonly, on the dorsum pedis; they were generally filled with a black slough; and, on this being detached, the tendons were seen passing over the granulations of the hollow beneath and, not unfrequently, going into the same state with the slough above.

Mr. Burnard shows that "Dysentery and Diarrhœa were the diseases which proved most fatal" in this Campaign.

In Burmah.—The prevalence of Hospital Gangrene among the Native troops, during the first Burmese War in 1825 and

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In his invaluable *Medical Sketches of the Expedition* (of 1840) *to China*, (Finch's India Journal of Medical and Physical Science, 1845), Mr. Alexander Grant describes that, while stationed on the North side of Hong Kong, the 37th Madras N. I. suffered much from Fever, Dysentery and Malignant Ulcers on the lower extremities. These unfortunate troops, ill fed,—being debarred by caste prejudices from eating much of such limited supplies of food as were available,—and ill lodged in tents and mat huts, which a hurricane finally levelled to the ground, became, my friend informs me, thoroughly scorbutic; and, then, sloughing of the cornea was rife among them. At the same time, the Bengal European troops, similarly exposed, and rationed scantily on weavilly biscuit and salt meat, were attacked with scurvy,—bloated countenances, spongy gums, legs swollen, and covered with petechiæ,—and often died suddenly from effusion into the cavities. Ulcer was not developed in the European force, but cases of Scorbutic Sores occurred among the seamen in the Ships. For further information regarding this Disease of the Eye, vide *A Practical Essay on some of the principal Surgical Diseases of India, by F. H. Brett, page* 46, and *The Excess Mortality of Rajshahye Jail in* 1853, *with incidental observations upon the general causes affecting the Health of Prisoners in Bengal.* (Indian Annals, No. 2, for April 1854, page 653,) by Joseph R. Bedford.

* Mr. R. N. Burnard's *Sketch of the Medical Topography of Arracan*, &c. &c.—Trans. Medical and PhysicalSociety of Calcutta, vol. 3, p. 25.

1826, has been reported by Staff Surgeon Howard,* and Superintending Surgeon Robert Davidson.† We shall have to make further reference, presently, to Mr. Davidson's report. He remarks that the high caste Hindoos suffered most severely from this Gangrene, next the low castes, whilst the Mussulmans and Pariahs were least affected. This, he considered, is easily accounted for by the difference in the manner of living. Scanty unwholesome diet, with great exposure, and much hard work had been the lot of all; but the two last classes, less fettered by customs of caste, had obtained, from time to time, portions of animal food by shooting buffaloes, &c., in their various excursions against the enemy, and thus, to a certain degree, maintained their strength better than the former. The European troops suffered much from Scorbutic Diarrhœa, but were scarcely at all affected with Hospital Gangrene.

Mr. J. P. Grant has also given‡ an account of an Ulcer which attacked the Native troops in Burmah. He describes this disease as being most common and destructive until one season has been passed in the locality. In Burmah, the climate is more damp and lowering than their own; the food less stimulating and nutritious than that to which the Native troops have been accustomed, consequently the blood becomes defibrinised. Should this state continue beyond the first year,—Diarrhœa, Dysentery, Dropsy, and Beri-Beri, are produced. Ulceration is produced by scratches, by itch, syphilis, contusions, or leech bites. Mr. Grant remarked that, during the second year, Ulcers did not show themselves, but that Intermittent and Remittent Fevers appeared to replace them. A brief account of this Hospital Gangrene at Rangoon in 1824, has also been given by Dr. G. Waddell.§

It is mentioned, in the Madras Medical Board's Reports,‖ that, in Mergui, the Native troops are particularly liable to Skin Diseases, &c. A peculiar form of Ulceration, which affects both Europeans and Natives, is very common. It breaks out in different parts of the body, becomes as large as the palm of the hand, and spreads in one direction, as it heals in another; the sore presents a white sloughy bottom, with

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* Madras Medical Journal, vol. 1, page 413.

† Madras Medical Board's *Medical Reports* for 1850, page 262.

‡ Madras Medical Journal vol. 1, page 416, and in the *Medical Statistics of Malacca and Prince of Wales's Island.*

§ Bengal Medical and Physical Transactions, vol. 3, for 1827, p. 267.

‖ Tenasserim Provinces, page 194.

ragged edges, surrounded by a ring of a reddish or copper colour, and is attended with great pain and emaciation.

It is highly note-worthy that, with improved sanitary arrangements,—although there was great exposure and good vegetables were extremely scarce,—our European and Native troops, engaged in the last Burmese war, were generally free from this scourge. Many cases of Ulcer occurred, but there was no extensive outbreak of the disease.

The records of the last War, and of our subsequent occupation of Pegu show, as far as I have been able to refer to them, that Syphilis was comparatively mild in Burmah. But I am not aware whether this is still the case. It is worthy of notice that, in his *Practical Observations on the Ulcers, which prevailed among the Native troops at Rangoon, Prome, Tavoy, and Prince of Wales's Island, in the years* 1825-26-27-28-29, Mr. J. P. Grant remarks that, in Burmah, Syphilis both in its primary and secondary stages was an exciting cause of Ulcer. With Europeans in that climate, it was more productive of this disease than any other cause. In the primary stage, the *membrum virile* was, generally, first attacked, and next the groins; and so rapid, at times, was the sloughing stage that he had seen the whole organ drop off in a few days, and the disease pass on to the bladder. Ulcers arising from secondary Syphilis were, generally, situated on the tibia about its centre, and were very tedious after the sloughing process had ceased from the exfoliation of the tibia which usually took place.*

It is almost needless to add that Dysentery is one of the worst scourges of Burmah. Dr. Taylor describes the type of Dysentery prevailing in H. M. 80th Regiment, in Burmah in 1852-53, as being "the Hæmorrhagic or Phagedænic"—During the month of December, when the Hospital became crowded, he, certainly perceived mischief from the contiguity of numerous severe cases of Dysentery to cases of other disease, especially allied forms of disease, such as Fever, which, so circumstanced, he found particularly apt to fall into Dysentery,† so also Mr. Stewart, Surgeon of H. M.'s 18th Royal Irish, remarked,‡ that the Dysentery which then prevailed was both Hæmorrhagic

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* For further information regarding the prevalence of Scurvy Scorbutic Dysentery, and Ulcers among the troops engaged in the Burmese War of 1824-5-6, vide Madras Quarterly Medical Journal vol. 1, page 202.

† Indian Annals, No. 2, April 1854. *Annual Report of H. M. 80th Regiment.*

‡ Ibid, page 433.

and Scorbutic and was epidemic since the regiment came to Burmah. At Rangoon, towards the end of June and beginning of July, the disease assumed an infectious nature, in consequence of the over-crowding of dysenteric cases in Hospital, from the want of accommodation. Surgeon Stewart *believed that he was the only European alive who mingled freely with the patients;* and, although escaping the disease, he had never enjoyed good health since. The wounded, who were generally treated in the General Field Hospital, established at the point of disembarkation, and at the Convalescent Depôt, Amherst, mostly did well. There is no allusion, in the reports, to Hospital Gangrene or Surgical Fever.

Penang (Prince of Wales's Island).—Sir G. Ballingall has given* a full and very interesting account of Malignant Ulcer as occurring in the 2nd Battalion of the Royals, with which he proceeded to India in 1807. This regiment was five months on the voyage out to Prince of Wales's Island, without touching anywhere for water or provisions; the mens' constitutions were, in consequence, much tainted with Scurvy;† and, upon being exposed to mosquito bites, after landing, the trifling sores, thus produced, degenerated into Ulcers of a most formidable description.

In these cases, the ulcerative process advanced with great rapidity, and soon removed a great extent of parts, sparing nothing which came within its range; the blood-vessels were, thus, exposed to the ravages of ulceration, and there was, occasionally, severe hæmorrhage. Sometimes, an ulcer, after having extended rapidly, for a time, appeared to receive a check, and became stationary for a long period; sometimes it even advanced towards a cure, and again, suddenly, resumed a destructive action. These Ulcers were, at the time, very generally and, he believed, very justly attributed to the prevalence of a scorbutic diathesis in the men's habits, from a long sea voyage. He adds, however, that sores of a similar description have been observed in these localities in conditions where the usual circumstances of Sea Scurvy did not exist—(but where, we must add, the causes of Land Scurvy were, doubtless, in operation.)—He cites an account by Dr. Ward, of the Madras Establishment, of a destructive Ulcer prevalent amongst the Native troops at

* Op. Citat, page 156.

† Sir G. Ballingall, throughout his valuable article on Ulcers, as they occur in the Army, inclines to the opinion that the class of diseases which we now have under consideration are, mainly, of Scorbutic origin.

Malacca in the years 1827-28, which appeared to him to resemble, in every respect, the Ulcer which he, formerly, had an opportunity of seeing amongst the European troops in that quarter. According to Dr. Ward, these Ulcers appeared in two forms, the common and the phagedænic, the former differing little from Ulcers occurring at other stations in India, the latter appearing in two distinct varieties, the acute and chronic phagedæna.

On referring to Dr. Ward's* paper I find that he speaks of Cutaneous Affections as being common and troublesome among the natives of Malacca of all classes—Leprosy occurred among the lower classes of all tribes, and a Lazaretto had been established for the reception of these cases. "Syphilitic complaints," he says, "are very rarely observed in Malacca". Diarrhœa and Dysentery were common affections among the inhabitants at all times. The attacks, however, were seldom severe. Dr. Ward remarks, that "there is a plentiful supply of water in the town. Wells are attached to every house. It is, in many of them, brackish, containing a considerable portion of Muriate of Soda, Sulphate of Lime, and Sulphate of Magnesia. Very pure and wholesome water is, however, obtained from the wells at the foot of *Buket Cheenee,* which is in common use among the inhabitants. That diseases, occasionally, arise from the use of bad water is a common opinion among natives, especially Indian sepoys; but I have never been able to trace any case positively to this cause."

After giving an account of the Epidemic of Phagedæna, Dr. Ward goes on to say that Scurvy appeared about the end of the year 1827. Of Syphilis only 14 cases occurred during the year, most of them, as was found on enquiry, affected by the same woman. During the prevalence of the Phagedænic Ulcers, the *membrum virile* entirely sloughed off in two cases.

In *Malacca,* as well as in Penang, that inveterate form of Scabies, commonly known as Malabar Itch, is liable, by irritation or scratching, to run into Phagedænic Ulcers.†

In their Report on the Eastern Settlements‡ the Madras

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* *Official papers on the Medical Statistics and Topography of Malacca and Prince of Wales' Island, and on the Prevailing Diseases of the Tenasserim Coast,* by T. M. Ward, M. D., and J. P. Grant, Esq., Penang, 1830.

† Madras Medical Journal, vol. 1, page 412.

‡ Page 243.

Medical Board remarked, in 1844, that, for several years past, the troops had been very healthy. Cases of Phagedænic Ulcer, described by Dr. Ward, which prevailed so extensively in the 25th Regiment, Madras N. I. in 1827 and 28, are not now seen; though, as at all the stations on this coast, Ulcers are frequent and troublesome; all abrasions of the skin being apt to run into ulceration from a cachectic state of the system induced by poor living, the peculiar moist state of the climate appearing also to be conducive to this disease.

Returning to *Penang*, we find that, in 1825, this disease committed great ravages in the 65th Regiment Bengal Native Infantry upon their arrival at this station.*

In this case, there was a great deficiency of the rations which continued for many months after the regiment reached that part of the world. The men being unable to obtain dholl and ghee (pulse and clarified butter) were forced to subsist on rice alone, with vegetables dressed in oil, usually of very indifferent quality and without a due proportion of spice, which might, he thinks, have, in some measure, obviated the effects of this very meagre diet. In general, also, this corps was deficient in proper clothing, and, on their arrival at Penang, scarce a man possessed a coverlet. In eight months, there occurred 281 cases of this disease, 40 of which proved fatal. Amputation was performed in 9 cases, and was followed by death in 4† After harrassing the corps for a year, the Ulcer disappeared, and Fever and Diarrhœa became the prevailing diseases.

Again, in 1827, upon a Madras Force being sent to Penang to relieve the Bengal troops, a Malignant Ulcer‡ made its appearance in the Hospital of the 25th Regiment Madras Native Infantry, when the corps had been resident in the Island for about six weeks. It soon extended rapidly and destructively. 24 cases were admitted during the first month and, for each subsequent month, the average number of admissions was 22, many of them of the worst phagedænic form. The total number of cases, during

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* *On Gangrenous Ulcer*, by J. Leslie Esq., Transactions of the Bengal Medical and Physical Society, vol. 3 for 1827, page 151.

† According to Dr. Ward, the total admissions numbered 388, and the deaths 41.

‡ Fully described by Mr. J. L. Geddes, in the Bengal Medical and Physical Transactions, vol. 6, for 1833. p. 147; and by Dr. Ward, vide also a description of the Ulcer, prevailing in Penang, in the Madras Medical Board's Topographical Report, Eastern Settlements, page 218.

the year, was 263 of whom 10 died. During 1828, 145 were admitted and 6 deaths took place, but the sloughing form disappeared in the early part of that year and Fevers, of which, hitherto, there had been but few instances, became prevalent. The Head Quarters of the 35th Madras N. I, 710 strong, arrived here. During the following month, Ulcer became prevalent. The chief severity of the endemic lasted for about five months. The total number of cases, during the year, was 152, of whom 20 died and 13 had their legs amputated. In 1828, the admissions were 91 and the deaths 2. In 1827, the number of Remittent and Intermittent Fevers was only 30; while, in 1828, after the cessation of the Ulcers, they amounted to 273.* Ulcers did not prevail among Europeans, nor did they affect the Native officers of the different corps.

Dr. Ward states that Ulcers, often of a phagedænic nature, are common among the Malay and Chinese new-comers, not properly assimilated to the climate. Leprosy is also of common occurrence, especially among the lower classes of Chinese. Next to Fever, the most common complaint, among the European community at Penang, is, according to this authority, Dysentery—the deaths being at the rate of 1 in $10\frac{2}{3}$ treated. He remarks that the Madras sepoys, shortly after their arrival, partly from the want of fresh and wholesome animal food, and partly from some peculiar action of the climate, acquired a scorbutic taint which rendered them more subject to disease, prolonged their continuance in Hospital, and interfered with the efficacy of the remedies employed for their cure. Water, generally speaking of good quality, is to be had in almost every part of the Island. In some places, however, it is slightly brackish.

A tendency to Phagedænic Ulceration still prevails in this locality—especially among the poorer natives and emigrants, or transports from the Peninsula of India. In his Annual Report of the Penang Convict Hospital for 1858-59 Dr. J. B. King records 108 cases of Ulcer out of 572 admissions—none of these proved fatal. In the following year, however, he had, at the General Hospital, 92 cases of Ulcer, 10 of which proved fatal. Most of these cases occurred among the coolies sent from the sugar estates. Dr. King

* Dr. Ward observes that the circumstance of Ulcers prevailing in a corps at one time, and Fever at another, has been noticed, in the West Indies, by Jackson; and that both he and Chisholm are inclined to consider Ulcer as a peculiar modification of Fever, excited by miasma.

explains that the supply of labour from the Malabar coast is sometimes, for a year or two at a time, less than the demand, and employers, instead of being able to select able-bodied coolies, are compelled to put up with a proportion of weakly and emaciated old men and boys.* When they fall sick with Bowel Complaints and Ulcers, which are common in Province Wellesley among new arrivals, they hide themselves in their huts and have recourse to native treatment, which speedily deprives them of their remaining vigour. In the course of this year, Ulcers were the most prevalent disease in the Convict Hospitals. Out of a total of 830 sick, 235 cases of Ulcer were admitted. None of these cases proved fatal.

Now that the formation of a small Sanitarium, for European Invalids from Bengal, on the hill at Penang, is in agitation. These suggestive warnings of old and present experience, ought not to be lost sight of.

In the Madras Medical Board's reports, it is remarked that, at *Singapore*, Ulcers, of a grave character, are common about the change of the monsoons, when the weather is sultry and the frame relaxed, a condition of the atmosphere which produces a disposition, in common sores, to take on an unhealthy and often gangrenous action. In 1843, the 4th Regiment Madras N. I., stationed here, suffered considerably from sloughing Phagedænic Ulcers, they commenced about the begining of the month of September. Those of the worst form were generally situated about the lower third of the leg, or on the ankle and foot, and usually proceeded from some slight external injury, or from the pustules of itch. The patients complained of burning or stinging pain in the sore, which was, usually, of a round form and excavated. Several cases proved fatal, the patients either sinking from the effects of constitutional irritation, or, being reduced to a state of excessive debility, were carried off by colliquative diarrhœa. After the sloughs had separated, in two cases, amputation was performed. One of these did well.

In the Hospital for Chinese Paupers, at Singapore, Hospital Gangrene is, at present, almost constantly endemic.†

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† Who, in all probability, bring with them to Penang that tendency to Phagedænic Ulceration which, we shall presently show, is so prevalent on the Malabar Coast.

‡ For much valuable informatiou regarding the Forms of Ulcerative Disease prevalent on the Tanasserim Coast and Straits of Malacca vide an Article in the Madras Quarterly Med. Jour., for October 1839.

Batavia.—Lind states that, in 1763, the English Ships of War which touched here suffered more by the malignant and fatal diseases of the climate than in any other part of India. He describes this Fever as being of the remittent type, exceedingly mortal and malignant. It raged not only in the ships but through the whole city, which presented one scene of disease and death, streets crowded with funerals, bells tolling from morning to night, and horses jaded with dragging the dead, in hearses, to their graves. At that time, a slight cut of the skin, the least scratch of a nail, or the most inconsiderable wound turned quickly into a putrid spreading Ulcer which, in twenty-four hours, consumed the flesh even to the bone. On board the ships which suffered most from Fever they had the most fatal experience of this.

The Dysentery of Batavia has always been notorious for its deadly character.

Bontius devotes a chapter of his work to "an endemic papular disorder in *Ambogna* and the Molucca Islands, particularly, which, in its symptoms, resembles much the venereal disease." It dose not, however, arise from that cause. The Dutch call it D'Amboynse pochen. "There break forth on the face, arms and legs tophi or tumours, at first hard and schirrhous, and spread as thick over the whole body as corns and warts grow on the hands and feet in our country. If these tumours happen to ulcerate, they discharge a viscid and gummy matter, but so acrid and corrosive as to cause deep and hollow Ulcers with inverted lips. A nasty and ugly disease, and similar to the lues venerea, but that it is not attended with so much pain, nor do the bones so easily become carious unless by neglect in the cure."

"This distemper," he considered, "owed its origin to the peculiar nature of the climate and soil; to the air affected with salt exhalations from the sea and to gross and pituitous diet such as is yielded by most of the sea-fish, which the inhabitants constantly feed upon, as the country affords little other provision."

At *Ceylon*, during the Insurrection of 1817, Ulcers of the lower extremities were very prevalent among the troops. Dr. Henry Marshall has devoted a chapter* of his work on Ceylon to their history.

From the commencement of field duties in October of the above year, sore legs were numerous among the Europeans.

* Chap. viii. page 210.

The Ulcers did not, however, assume an extremely malignant form until towards the end of March, at about which period Fevers became more prevalent than they had been.* The prevalence of Ulcers was confined to the lower ranks of Europeans. The Malays and Caffries suffered little. No class suffered so much from this complaint as the Indian troops. Those of this class who were most liable to great variations of weather, extreme hard labour, privations in regard to food, &c., suffered in the highest degree. The exciting cause of these Ulcers was, for the most part, leech bites. A slight injury, of any kind, frequently degenerated into an ill-conditioned sore. Spontaneous Ulcers appeared, in some instances, on the legs of Indians. This circumstance seemed to be chiefly owing to the great constitutional debility of these people. Fatigue and uncleanliness greatly aggravated these Ulcers which were, therefore, for the most part, extensive and sloughy by the time the men were received into Hospital. Rest and soothing treatment frequently contributed much to ameliorate the sloughing state of irritable Ulcers; often, however, every means failed in arresting the progress of inflammation, and a consequent extension of the ulcerated surface. Recoveries were always tedious.

The extension of the sloughing disposition of the parts was often extremely rapid, all the textures of the extremity, not excepting the bones, became affected.†

The Andaman Islands.—Here, again, we find these Ulcers committing sad ravages among the transported felons, Scurvy being, at the same time, very prevalent. In his annual Report for 1859, Dr. Gamack remarks that, "Ulcers on the lower extremities were very numerous arising, principally,

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* Many of our authorities notice the simultaneous or alternate occurrence of these Ulcers, and of the Fevers endemic to the locality. During the rains, when Dysentery and Fever are rife, Surgeons, in Bengal, avoid the performance of important operations as much as possible—as wounds are then liable, at best, to heal with difficulty. The Madras Medical Board noticed, in their Topographical Reports, that the climate of Coorg (Western Ghauts) appears decidedly inimical to the cure of cuts, wounds, and sores, which are often totally unmanageable without change of air. This, they added, is a peculiarity, they believed, of other moist climates of India; such as the coasts of Malabar, Bombay, Arracan, and Tenasserim.

† These accounts are, necessarily, cited with great brevity. Those anxious to study the subject will find ample details in the original Memoirs. All that is attempted, here, is a study of the topographical distribution of this important class of diseases.

from wounds received while cutting down the jungle, or from the friction of the fetters; but, from whatever cause arising, all were tedious in healing and showed a great tendency to slough, more especially during the rains. Many of the cases had the early symptoms of Scurvy, and nearly all had suffered from Fever, hence their great intractability. During the fine weather, the Ulcers, although slow in healing, usually had a healthy character; but,—as soon as the rains commenced, in May,—nearly all began to change their appearance and become indolent, while many became gangrenous. These latter, at first, looked as if some of the granulations had burst, and the surface seemed covered with spots of clotted blood; and, probably, next day, a large grey slough would have formed all over the sore which, usually, spread to the surrounding integuments and, if not checked, ran rapidly up the leg; Diarrhœa supervening, and death relieving the miserable objects from their sufferings.

The mortality in these Ulcer cases, doubtless in a large proportion of instances from complicated disease, was enormous. Out of 814 cases treated, death occurred in 267. Only ten of these cases are distinguished as having been of the gangrenous form, of these three proved fatal.

Returning to India, we find Ulcers endemic along nearly the whole Western or Malabar coast of the Indian Peninsula, where that obstinate form of Cachectic Scabies, the Malabar Itch, is rife. Syphilis is extremely prevalent and virulent, and wounds are liable to be slow in healing.

In describing *Calicut* in their Topographical Reports, the Madras Medical Board state that the chief and perhaps only disease endemic in the district is the Malabar Ulcer, which is generally combined with Elephantiasis. It chiefly attacks the extremities, but sometimes the face, leaving its victims dreadful objects. Although it does not resemble Cancer in appearance, yet, in its effects and resistance of all remedial measures, it is not unlike that disease.

The victims of it,—for it is generally, in the end, fatal,—are the poorest classes of natives, who live on bad rice and fish, dwell in wretched huts, and in narrow filthy streets, overflowed with rain during the monsoon.

In the Report on Travancore, it is remarked that the prevalence of Ulcers, of various kinds, on this coast, is proverbial, and it would be difficult to form any classification amongst them. Leprous and Venereal sores are conspicuous, as well as

those of a phagedænic and sloughing character; many of these cases have been traced to repeated attacks of lues venerea.

Venereal Diseases, the Board remark, are exceedingly prevalent on this coast, where they are found to exist in their most virulent forms. Psora—the Malabar Itch—is also very general, and frequently assumes a virulent and obstinate form. It is, they consider, no doubt, occasioned by the poorer classes subsisting so much on fish, which is often, from partial decomposition, unfit for food, and the effluvia from which, on passing the market places, is sometimes almost intolerable.

At Dindigul, in the Southern division, it is noted that Ulcers of the legs and feet prevail, during wet weather, both among the sepoys and villagers, and are chiefly occasioned by want of cleanliness and poor diet, as the higher classes are exempt from them.

It is interesting to find that a similar class of diseases occurs, under nearly the same circumstances of climate and constitution, in the West Indies. Dr. Chisholm, who has given a very full description of the Ulcers prevalent in those Islands,* shows that they occur there as an epidemic, at a certain season of the year, apparently depending on a diathesis produced by endemic causes. Most of these Ulcers are met with in situations which are marshy and productive of Remittent and Intermittent Fevers, Hepatitis and Hepatic Dysentery. It is among those most exposed to external injury during the hot and wet season,—soldiers, sailors, the lower orders of white servants on plantations, and more especially negroes,—that the Ulcers are most prevalent. The debility which heat and marsh exhalation unite in producing is remarkably observable in these Ulcers the aspect of which is pale, indolent and flabby: † They generally arise from slight scratches, pricks of thorns, &c.

Another most troublesome and obstinate Ulcer generally makes its appearance there (more especially among negroes newly arrived from the coast of Guinea) either in the form of a pimple or a small vesicle which, bursting, discharges a sanious matter, or a limpid fluid, evidently possessed of a

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* Op. Citat, part 1st, chap. 4th, and part 2nd, chap. 14th.

† It is worthy of remark that, among the natives, the juice of ripe limes, with which the Ulcers are smartly rubbed twice in the day, the ulcerated surface being, afterwards, covered with cut slices of the fruit, is a popular mode of treatment. Lime juice was, long since, recognised as, as one of the best applications for true Scorbutic Ulcers.

very irritating and corrosive quality, which shows itself by an intolerable itching, and a very speedy enlargement of morbid surface. In eight and forty hours, an ulcerated surface more than two inches in diameter will be formed. Chisholm's description, which is too lengthy for quotation, shows that this Ulcer is phagedænic in its character—it is generally attended with great enlargement of the limb, like that in elephantiasis. The ulceration is seldom deep ; but he has known instances of its penetrating, occasioning a caries and, at length, such a morbid state of the limb as to render amputation necessary. This Ulcer, he says, differs considerably from all others, within the Tropics, not only in the features above described, but in its being always, whether superficial or penetrating, of a bright red colour, and without any collection of matter of any description; and, when it extends itself in the astonishingly quick manner above mentioned, no sloughing has been observed. The best auxiliaries to appropriate local treatment were found to be nourishing simple diet, scrupulous cleanliness, and moderate exercise on foot.

I have dwelt at considerable length upon this important class of diseases, believing that, without thoroughly understanding them in India, we cannot sanitate successfuly for our Hospitals, or thoroughly control a large proportion of the gravest diseases which there present themselves. We have seen how large a tract of country these diseases extend over, as endemics ; we have observed that, wherever there is a soil highly impregnated with saline matter, especially within and upon the borders of the Desert Tract, and on a great part of the seaboard of India and of its Islands; wherever nourishing antiscorbutic vegetables are scarce, or the staple food of the Native troops and poorer classes of inhabitants consists of unwholesome fish and bad vegetables; wherever the air is peculiarly damp, close, hot, and loaded with miasm,—(and how large a portion of our Indian possessions presents one or other of these characters) ; such Ulcerative Disease is rife and, even when not itself patently developed, is liable to impart its characteristics to the worst diseases in Hospital,—in fact, to create a class of Hospital Diseases, a series of deadly complications superadded to ordinary disease ;—to aggravate Syphilis and to give its ulcers a phagedænic character,—to increase the prevalence of extensive ulceration,

sloughing and hœmorrhage in Dysentery,—to determine the occurrence of Hepatic Abscess, and of Splenic Enlargement,—to make skin diseases intractable,—to interfere with the healing of simple ulcers and wounds,—to render many otherwise safe surgical operations mortal.

That this condition is, in its degrees, one of latent or fully developed Scurvy cannot, I apprehend, be questioned; and I believe that, in the possession of this fact and its judicious application, we obtain a great insight into the origin of certain of the worst diseases of tropical climates, and a command of the means of preventing them.

The above narratives show that, under ordinary circumstances, Native troops, when sent abroad and exposed to great hardship and privation, are chiefly liable to suffer from this class of diseases; but that it is only,—(1st) under like circumstances of great exposure and want of the ordinary comforts and necessaries of life, and (2nd) when posted in stations where the soil and the water are saline, and antiscorbutic vegetables are scarce, or are little used and where, consequently, Scurvy is endemic,—that our European troops suffer from these ulcerations;—but where shall we place the limit to the spread of those influences which engender their analogues, intractable Syphilis* and sloughing Dysentery? which are,

* *The Laws which govern the Spread of Syphilis in Armies,* form a most important subject of study to the young Military Surgeon. The leading facts are known to every one in the profession, but I doubt whether they have, by any means generally, received correct appreciation. It has been remarked by Herbert Mayo that, "In our own times, there has been experience of more than one sudden increase of the severity of the venereal disease; and *it is remarkable that the occasions to which I refer have been the march of Armies into foreign countries.*" After the Battle of Jena, Baron Larrey, in giving an account of the French quartered in Berlin, observes, that the most serious malady was Syphilis, with which considerable members of the troops were afflicted, and which, in many, presented a very troublesome character. In our own troops, on the Peninsula, the same circumstance was observed. "In the British Army," observes Dr. Fergusson, "In 1812 more men have been mutilated by primary venereal sores during the four years that it has been in Portugal than the registers of all the Hospitals in England could produce for the last century; while venereal ulceration has not only been more intractable to the operation of mercury than under similar circumstances at home, but the constitution, while strongly under the influence of the remedy, has become affected with the secondary symptoms in a proportion that could not have been expected. With the Natives, on the contrary, the disease is very mild,— curable, for the most part by topical treatment alone, or wearing itself out, when received into the constitution, after running a certain course (not always a very destructive one) without the use of my adequate mineral remedy. Elsewhere in his

self-evidently, complications of ordinary mild disease, developed in constitutions in which Scurvy is latent, in patients whose gums are not spongy, and who perform their duty actively until they suddenly fall victims to incurable disease.

I feel confident that the time will come at which, in well drained stations, abundantly supplied, throughout the year, with wholesome fruits and vegetables, beef and mutton, the European troops, in well built barracks, and with a pure water supply, will be as secure from Sloughing Dysentery,—(that disease which is the deadliest of all in Madras and Bombay: and is the most destructive, but one in this Presidency)—as they now generally are from Endemic Ulcers and Hospital Gangrene.

Notes and Recollections, Fergusson adds,—the Portuguese, I may almost say, had no phagedæna."

It has also been generally noticed that the prevalence of Syphilis in an army is liable to rise to a maximum after a Campaign. This happened very remarkably after the late mutinies in India. Syphilis became so prevalent, in our European army, as to attract the attention not only of the medical authorities, but of the public journals.

Medical men have, I think, been too ready to accept hasty and superficial explanations of these important facts,—thus Dr. Fergusson "attributed the destructive effects of the venereal virus, when transmitted from the Natives of Portugal to the British, partly to its being in some measure new—a branch of the virus which had become modified by passing, for several centuries, through a stock of different habits, constitutions, climate;" partly only "to the state of health of the parties who received the infection," and Mr. Mayo was willing to accept this theory of the aggravation of Syphilis, when the disease is transmitted by the inhabitants of one country to those of another. Again, the prevalence of the disease, after Campaigns, has been considered to be sufficiently accounted for by the fact that, the troops having reached their Capua, with arrears of pay to spend, give way to unbounded profligacy and intemperance. This explanation also falls short of demonstration.

It must be borne in mind that it is not so much the great spread of the disease which occurs under these circumstances, as the extreme aggravation of its type which makes it the subject of notice. The fact that nine-tenths of the men in an army had been, almost simultaneously, attacked with a mild and tractable form of disease would only deserve and receive a passing notice,—it is the extreme malignity of the disease, the deaths, the dismemberments, the irreparably broken constitutions to which these outbreaks owe their historical character.

In ordinary civil practice, the predisposing causes of syphilitic sloughing pagedæna are generally recognised,—want, exposure to the inclemency of the weather, intemperance, immature age, filth.—In every case, the influence of, at least, three of these five causes will be found in operation. The worst sufferers are always persons of bad constitution.

So also, in tracing out the history of the great outbreaks of Syphilis, which occurred in the worn French army beseiging Naples in 1495, and among the storm-tossed, scurvied seamen of Columbus, on their return

Every professional reader is aware that Intermittent Fevers and Dysentery, Leprosy and Scurvy, were the most prevalent diseases of our own Country, nay, indeed, of the whole of Northern Europe up to the seventeenth century; when drainage and cultivation and the introduction of an abundnace of wholesome fruits and esculent vegetables, placed a valid check upon their ravages.

The almost entire extermination of Scurvy, Dysentery, and Intermittent Fever in London is one of the most striking facts in sanitary science. In the article cited above, we are told by Blane that there is the most incontrovertible evidence, from the Bills of Mortality and from professional and other writings, of the great and rapid decline of these diseases. It appears, from the Bills of Mortality, that, in the seventeenth century, the annual deaths from Bowel Complaints, of which Dysentery was the principal, fluctuated from 1000 to 2000, some years amounting to upwards of 4000; that they fluctuated from 1000 to 100 in the first part of the eighteenth century, and from 100 to 20 in the latter half of it. The Bills, for the first ten years of the present century, give an annual average of 22·8 deaths under this head. Heberden gave nearly the same statistics, justly urging that there is scarcely any fact, deducible from the Bills of Mortaliy, more worthy the attention of physicians than the gradual decline of the Dysentery.

Blane cites a description which Willis has given, showing that a disease, having the general characters of Sea Scurvy, prevailed in London in the seventeenth century. He adds, that the scanty supply of fresh vegetable food for man, and winter fodder for cattle, which made it necessary to slaughter

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from the West Indies two years earlier, we find the like predisposing causes in operation.

It is then, I believe, among worn, intemperate, scorbutic troops, that these widely spreading and destructive outbursts of specific disease are to be looked for, and to be guarded against by self-evident sanitary precautions.

In a very able and suggestive paper published in the first volume of the Madras Medical Journal, Dr. John Clark, of H. M. 13th Light Dragoons, has clearly adopted this view, and has strikingly illustrated it by the fact that, while his regiment was stationed at Bangalore, during the dreadful famine of 1833, the poor and half-starved villagers had been known to cohabit with the men of the regiment for a handful of grain. He gives a return of admissions, for Syphilis and Gonorrhœa, in the regiment, drawing attention to the fact that, whilst during ten of the years between 1820 and 1834, the number of cases ranged from 63 to 110—only in one year reaching 140 annually,—the admissions, during the four exceptional years, *which were years of Famine*, ranged from 226 up to 350.

and salt them for winter use, and the greater uncleanliness and dampness of the streets and houses account for the existence of Scurvy in those times.

In like manner, the Registrar General, in a comparison of the mortality rates of London in 1660-79 and in 1859, shows that, to 100,000 living, the mortality by Fever continued or Remittent, and Ague was at the rate of 749 and 59 in the two periods. A few (8) in 100,000 die now of Dysentery; then, out of the same number, 763 died, annually, of that disease.* By Diarrhœa 11 died then, 120 now; Cholera was fatal, in 1859, to 7, but, in the 20 years (1660-79), to 130 annually. Syphilis was nearly twice as fatal as it now is,—the numbers being 21 and 12. Scurvy and Purpura bear testimony to the imperfect nutrition of the population; The annual deaths were then 142, and are now 2. Vegetables, fruit, and fresh meat could, with difficulty, be procured in winter.† Worms and all parasitic creatures that crawl over, bite, and prey on the body of man, were prevalent; 10 deaths were ascribed to worms. Dropsy, a result and sign of Scurvy and Fever, was exceedingly fatal, 298 died of that disease, and 26 now. Apoplexy, Paralysis, Epilepsy, Affections of the Brain,

* A very striking illustration of the extreme infrequency of Dysentery in London, in the present day, was displayed in the general want of practical acquaintance with the disease, in its acute form, which marked the evidence of several of the most eminent Physicians of that Metropolis, in their evidence at the trial of Smethurst. On that occasion, the occurrence of obstinate vomiting in this disease,—a condition with which every medical man, in this country, is only too familiar, not only in pregnant females but also in men,—appeared to be generally regarded as an almost inexplicable anomaly.

† According to Trusler and others, esculent vegetables were first imported to England from the Netherlands, about 1509, there having been, previously, no kitchen gardens in the country. Hops were first planted in England in 1524.

"Turkeys, Carps, Hoppes, Piccarel and Beer,
Came into England all in one year."

Currant trees in 1533, cherries and Pears 1550, Apricots and Artichokes in 1578; Queen Catherine of Arragon could not procure a Salad until a gardener was brought from the Netherlands to raise it, Carrots came in the reign of Elizabeth, Asparages in 1602, (this vegetable is, however, indigenous) Cauliflowers 1603, Potatoes were introduced into Ireland in 1610, and into England in 1650.

It was lately mentioned in the public prints, I know not how far correctly, that inquiries have been made regarding the cost of Vegetable Farms, for the supply of Military Cantonments in India. The entire annual cost of supplying 1000 men, in this way, will be about Rs. 3,000, or one-third of the cost at present incurred. The vegetables, it is considered, would be much better than those obtained by contract.

and Suicide are more fatal, now, than they were, in the proportion of 57 then to 151 now. Consumption and Diseases of the Breathing Organs were uncommonly fatal; 1079 then and 611 now, are the figures of the mortality. Diseases of the Digestive Organs were fatal, then and now, in the proportion of 146 and 95. Stone and Diseases of the Urinary Organs are now as fatal as they were then, the deaths being 21 and 30. Children were rapidly cut down; of Convulsions and Teething 1175 died then, 136 now.

Blane justly remarked that, "*The diseases chiefly incident to savage and barbarous nations are Fevers, Fluxes, and Rheumatisms.*" The above facts, and many others that have been and might still be adduced, show that our ancestors, even those of the most exalted rank, perished mostly from the diseases which now thin down the native inmates of our Indian Jails.* The tables which were given at the commencement of this article clearly demonstrate that our European troops, throughout the length and breadth of India, die the death of the barbarous. Seeing that the progress of Civilisation, rather than that of Sanitation, has nearly extinguished, in England, those maladies which sap the vigour of our European Force in India,—may we not

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* Some years since, I collected a multitude of instances in which Royal and Noble Personages, in Europe, had suffered and died from Dysentery and Malarious Fever. These notes have been mislaid, but the following are a few examples,—cases of death from Pestilence and Small Pox have been excluded.

Dysentery.—Prince Henry, Son of Henry 2nd, a Fever and Flux 1183; King John, Fever and Dysentery; Edward 1st, Dysentery contracted in the Field, 1307; Henry 5th "Fever and Flux which he had contracted in the long fatigues he had undergone in the wars." Cardinal Wolsey, who described his own case, evidently with full knowledge of the usual course of Sloughing Dysentery. "I have a Flux with a continual Fever, the nature whereof is that, if there be no amendment within eight days, either excoriation of the entrails will ensue, or frenzie, or else present death, and the best of them is death, and (as I suppose) this is the eighth day." He died almost immediately afterwards. Robert Dudley, Earl of Leicester; and Walter, Earl of Essex, Temp. Elizabeth.

Fever.—Earl of Gloucester 1146; Henry VIII, "a Languishing Fever Queen Mary" "a burning Fever" then epidemic, Cardinal Pole died of the same disease. Henry Prince of Wales of Adynamic Fever. James the First, an Ague, which Baker terms, "the ordinary highway, especially in old bodies, to a natural death," Oliver Cromwell, a Tertian Fever, with extensive Splenic disease. Charles the 2nd, Eclampsia, evidently of Malarious Origin. Elizabeth, Daughter of Charles 1st, *ex febre malignâ tunc grassante.* The second Villiers Duke of Buckingham,—"a mighty descent fallen upon the abdomen" following a Chronic Ague.

justly hope that, under the blessing of Providence, the constant and judicious employment of a scientific preventative system may, ultimately, rid our Eastern Possessions of these essentially preventible diseases?

The Selection of Proper Sites for Military Hospitals.—Upon this important point I have but little to add to the remarks submitted in the preceding chapter on the choice of sites for Barracks. All experienced medical authorities, in India, are unanimous in the opinion that the Hospital should be placed as near the Barracks as the circumstances of healthy locality, water supply, &c. &c., will permit of. While skulking and panic must be, alike, prevented, the soldier, in this country, has to be taught that the deadliest maladies of the climate are readily checked when treated early. He must have no difficulty in resorting to the Hospital, where even his most trivial complaints will be considerately attended to, his groundless apprehensions will be dispelled, or he will be placed under observation for a few hours, during which a threatened attack of Insolation, Cholera,or Dysentery may frequently be averted.

Even of late years, it has, occasionally, become the subject of question, here, whether, in situations where a force, consisting of some three or four Regiments, is stationed, a large General Hospital upon a handsome scale and replete with conveniencies, should not be erected, in a well chosen spot, for the reception of the sick of the whole force, where they would be attended by their own medical officers. This course has been strongly and with justice objected to by the medical authorities, who maintain that each corps should, invariably, have its own Hospital, close to its own Lines.

We have, already, quoted the Clause of the Bengal Military Regulations which insists that, "In Garrisons and Cantonments, the Quarters of Medical Officers must be as near their respective Hospitals, as may be practicable, and have insisted upon certain grounds which appear to show the necessity of providing all Regimental Medical Officers with public quarters."* These should, of course, be constructed upon the best principals of Indian house architecture, being, in all localities, upper-roomed. The health of the Medical Officers cannot be overlooked in sanitating for Troops.

Of late, the question of establishing Hospitals in *Town* or *Country* has been much agitated.

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* Page 343.

It was, long since, established that, for the most part, higher rates of mortality prevail in cities and towns than in agricultural districts. Upon this, it was early remarked* that a large town is usually less favorable to health than a small one, and that, so, the annual deaths in metropolitan Hospitals will, usually, exceed the proportion of provincial ones.†

While it is evident that the erection of Hospitals in crowded cities is often an unavoidable evil, it is proper that we should be fully aware of the strong sanitary objections to which this arrangement is open.

Miss Nightingale observes, with great justice, "If the recovery of the sick is to be the object of Hospitals, they will not be built in towns. If medical schools are the object, surely it is more instructive for students to watch the reco-

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* Hawkins,—Op. citat.

† The whole principle, now under discussion, was thoroughly and even popularly understood by our ancestors who, during the Hospital building fashion which prevailed early in last century, exercised great discrimination in choosing sites for the new London Hospitals, according to the actual requirements of the several neighbourhoods. Guy's was placed in the centre of a poor and unhealthy quarter, adjoining a main thoroughfare. The London was erected close upon rapidly extending Docks. The Sites of the Middlesex and St. George's were chosen with due regard to the virtues of country air. The one in the neighbourhood of the, then, new quarter of "Oxford Road" the other near the largest terminus for stage coaches in England, where, consequently, severe accidents were of very frequent occurrence. Then Saint Luke's, and, considerably later, Bethlehem Hospitals, for Lunatics as well as the Small Pox and Fever Hospitals, were placed far out of the reek of the city.

A witty article "on The Art of Parrying Charitable Subscriptions" printed in the *Gentleman's Magazine* in 1760, shows that all the *pros* and *cons* of this question had, then, been accurately weighed. "Suppose now, for instance," says this œconomical adviser, "that you are asked to subscribe towards erecting an Infirmary or new Hospital;" you are not, immediately, to refuse your contribution; nor is it necessary, for you may say,—'The design seems a good one, but it is new to you, and you would, willingly, take a little time to consider of it; because, if you do anything in this way, you would like to do something handsome.' This puts off the demand for the present; and, before the solicitors call again, inform yourself of all the circumstances of the intended situation, constitution, government, qualification of patients, and the like; then, when all is fixed, *if you learn that it is to be placed in the Fields, you think it would have been much better in the City, or nearer to the poor, and more at hand to relieve them in case of accidents and their other distresses; and, besides, we have, already, hospitals enough in the Fields. "If in the City, you can only approve of the Fields, on account of the purer air, so necessary for the sick."*

very from, rather than the lingering in, sickness.* Twice the number of cases would be brought under their notice in a Hospital in which the sick recovered in half the time necessary in another."

"According to all analogy, the duration of cases, the chances against complete recovery, the rate of mortality must be greater in town than in country Hospitals."

"Land, in towns, is too expensive for Hospitals to be so built as to secure the conditions of ventilation and light, and of spreading the inmates over a large surface area, instead of piling them up three or four stories high—conditions now known to be essential to recovery."

So, also Dr. Simpson remarks—"Surgical patients, no doubt, recover in greater numbers when breathing the pure air of the country than the more vitiated air of the city, and when operated on at home rather than in the close and crowded wards of an Hospital. I have often taken occasion to ask, of country Surgeons, the results of their greater operations, and been astonished at the small proportion of losses they met with in comparison with the mortality accompanying the same operations in our larger Hospitals."

Only too many instances of the evil operation of a filthy town neighbourhood upon the sanitary condition of Indian Hospitals might be cited. Not one of the Calcutta Hospitals is free from this objection.

The Medical College Hospital (which, annually, receives about 5000 in-patients, European and Native, is nearly equal proportions)—a most superb building, but a very ill-constructed Hospital,—has been erected in the centre of one of the filthiest Native quarters of the town, in the midst of a net-work of open sewers, without fall, nearly brimful of semi-solid cess-pool filth, abominable and noisome to a degree which no one who has not seen Calcutta can possibly imagine. In the course of years, Government have, most liberally, purchased and cleared considerable portions of the adjoining ground at a great outlay, and the building has now, at its back, a considerable open space; but it is still faced by a large block of most filthy

* Still we must note, upon this judicious remark, that it is of immense consequence that every medical man should be acquainted with disease not only in those types which it assumes in the Country, but also as it is modified in crowded Cities and in unhealthy Hospitals. In his practice he will find his smooth sailing in dealing with the former—his rocks and shoals, obscure diagnosis, baffled treatment in contending with the latter.

Native huts, chiefly occupied by cow-keepers, the nearest of which lie within the shadow of its portico, being only separated from it by a narrow slip of court, and an equally narrow road.

The want of conservancy in this plague spot is absolute. passing, some time ago, I saw the entire skeleton of a sheep, lying on a heap of manure within sight of the Hospital windows. On referring back to the table which I have given, the reader will not be surprised to find that a very high proportion of the amputations prove fatal, chiefly by pyæmia, in this Hospital. Writing in 1854, when he was in the habit of visiting its wards in his capacity of Government Examiner in the College, Dr. Kenneth Mackinnon stated that wounds, made in operating there, are apt to take on an erysipelatous action, tending to sloughing, especially in the rains.

The Calcutta General Hospital with the Garrison Hospital (the latter being set apart for the reception of the sick of the European Regiment garrisoning Fort William), face the Calcutta Plain, but have, at their rear, concealed from the passers by, a neighbourhood which has, for many years, been (like that of the College Hospital) the subject of the strongest medical animadversion.

Twenty years ago, Inspector General McLeod remarked that "The Regimental Hospital forms the East wing of the three buildings called the General Hospital, which stand in a low and damp compound surrounded by a high wall, which separates them from the village of Bhowaneepore on two sides—the East and the South," (*i. e.*, the village lies to wind-ward.) "The huts of this village (notoriously the most populous, the most filthy and the most unhealthy of all the suburbs of Calcutta)* are, actually, built close up to the wall, above which they may be seen raising their thatched roofs, interspersed with shrubs and trees, and rank vegetation of all sorts, which are encouraged by the Natives as a screen to hide their hovels, their dung-hills, and the filthy puddles where they wash themselves, and round which they deposit all the ordure and the offal of the village. There is a deep

* Sir Ranald Martin who, at one time, held the appointment of Assistant Surgeon to this Hopital, describes Bhowaneepore, in his Notes on the Medical Topography of Calcutta, as the most populous of the Native suburbs. He believes that it was the most severely visited by the Epidemic Remittent Fever in 1833, To this calamity, he adds, it would seem peculiarly exposed through its low closely-built and ill-ventilated streets, its great stagnant ditches lined with rank vegetation, its back-ground of extensive marsh and underwood, and its innumerable half-dried tanks and pools.

and stagnant ditch, immediately without the wall, in some places wet, in others dry, and which, so far as I have been able to discover, has no outlet, even in the rains. I have, several times, attempted to walk round between the wall and the huts; but, hitherto, without success. The number of pools and tanks has never been counted. In short, it is the dirtiest village I can recollect ever to have seen in India. I here speak more particulary of that narrow strip of ground lying between the Hospital wall and the road leading Eastward from behind Mr. Beardsmore's Lunatic Asylum" (this is now the Government Lunatic Asylum, for Europeans)—"in which there are not more that two or three poor brick buildings, and I should think that the whole might be cleared away at a very trifling expense. This space is occupied by the very lowest of the populace of the suburbs, and, in a great degree, by the families of sweepers and people attached to the Hospital. In it, also, are haunts for the sale of country spirits and debauchery of all sorts, attended with the noise and uproar usual in such places. In 1804 or 5, a memoir was given in to Government, by Dr. Buchanan, respecting the unhealthiness of this locality, in which he recommended that this collection of nuisance and rubbish should be cleared away and added to the Esplanade, as a means likely to improve, in a great degree, this part of the suburbs, and, especially, to diminish the mortality in the General Hospital."*

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* The present building was erected in the year 1795. The Proceedings of the Calcutta Hospital Board of 1786 contain a striking account, by Dr. Fleming, of the defects which he discovered in the old General Hospital,—(apparently that so ill-spoken of by Captain Hamilton, early in the century)—when he joined it, as Surgeon, in that year. The building was in a miserable state of disrepair. He writes,—"So deplorable is the condition in which I found it, so many the evils to be remedied, and the defects to be supplied that, *instead of being, as it ought to be, a commodious habitation for the sick, it is one of the most destructive places to which they could be sent.*"

"It is universally allowed that sobriety, fresh air and cleanness are as much, or perhaps more consequence in the prevention and cure of diseases than either diet or medicines; and it is evident that, whatever care the Surgeon may take to provide his patients with wholesome food and the strictest medical attendance, his endeavours must be fruitless, if the Hospital be so ill-secured that the soldiers can have access to spirituous liquors whenever they think proper, if the wards are so ill-constructed as to render it impossible to keep them dry and clean, and if the men be under the necessity of breathing an atmosphere contaminated by the stink of necessaries fitted up under the same

Suggestions of the above kind are readily made, with a few strokes of the pen; but, to carry them into effect, is a far more difficult matter. Government have endeavoured, even of late years, to obtain portions of the ground in question, and have failed,—the native proprietors having placed fabulous prices upon what they term their "ancestral property." In India, however, where the evil of a crowded and filthy neighbourhood cannot be removed by an enormous outlay of public funds, they are generally susceptible of some mitigation by the municipal authorities.†

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roof and on the same floor on which they sleep. This, however," he adds, "is an exact discription of the Calcutta Hospital."

He shows that the wall which surrounded the Hospital had been built on a level without any regard being paid to the different heights of the ground on which it stood. It was, therefore, in many places, so low as to be entirely useless. Hence, it was impossible for any number of centinels to prevent the men from procuring as much liquor as they were able to purchase from the numerous Arrack Shops, with which the hospital was surrounded. The door-way in this wall had never been provided with a gate. The drains which had, originally, been made too narrow to be easily kept clean, were then all choaked up, and their brick-work, in many places, was quite destroyed. The space between them and the bottom of the house wall, instead of sloping outwards, was contrived in such a manner as to throw the water in upon the ground-floor "*consequently, the Hospitals stood in and had their lower rooms constantly overflowed by a stinking pool of water impregnated with all the filth of the Hospital.*"

"There never having been any proper Necessaries built, a small room in each ward, has hitherto been appropriated to that purpose. The pernicious consequences of this economy are so obvious that it is needless to describe them. Were Necessaries built on the outside of the house at a moderate distance from each wing, at least nine men in ten of the sick would be able to make use of them. This would render it much easier for the Hospital servants to keep clean those men who were bed-ridden or whom, for fear of contagion, it might be improper to allow to go to the common Necessaries."

It is here worthy of remark that, only two months ago, official notice was taken of the "noxious effluvia from the privies" (of the present Garrison Hospital)" which are on the same level and in the same house, *open* to the wards."

† Under Clause 23 of Act No. XIV. of 1856 for the Presidency Towns. "Whenever the Municipal Commissioners, by report of competent persons, are satisfied that any existing block of huts, in or near any street, is, by reason of the manner in which the huts are huddled together, or of the want of drainage and the impracticability of scavengering, attended with risk of disease to the inhabitants or the neighbourhood, they may, with the consent of the Local Government, cause a notice to be affixed to some conspicuous part of such block of huts, requiring the owners or occupiers thereof, within such reasonable time as may be fixed by the Commissioners for that purpose, to execute such operations as the Commissioners

The nuisance of the great Bhowaneepore ditch has been again, recently, the subject of report.

The frequent objections raised against the site and construction of the Presidency General Hospital led, about four and twenty years ago, to the construction of a very handsome upper storied building intended to be used as a Garrison Hospital, but which has never been so employed, being occupied as the Court-house of the Sudder Dewanny Adawlut. It is singular that, in selecting a site for this building, a spot close to the General Hospital was chosen. It is equally remote from the Fort, indeed somewhat more so, and, although its position is tolerably open, it immediately faces the great Military Burial Ground, premises of no considerable depth intervening. Such is the open space over which the prevailing South winds would have visited the sick in this building, and such the prospect which they would have beheld from its verandahs.*

In 1859 it appeared in the Proceedings of a Committee appointed by Government to report on the Improvement of the Madras General Hospital, that "The present building was erected as a Dutch factory for goods, 135 years ago. The objec-

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may deem necessary for the avoidance of such risk; and, in case such owners or occupiers shall refuse or neglect to execute such operations within the time appointed, the Commissioners may cause the said huts to be taken down, or such operations to be performed, in respect of such huts, as the Commissioners may deem necessary to prevent such risk."

* We need not say much upon the unadvisability of placing Indian Hospitals near—especially to leeward of Burial Grounds, which, when, on a large scale, can scarcely be kept free from rank vegetation in the rains, and give off the odours of animal decomposition most profusely. I have, fortunately, not been very frequently in the Garrison Burial Ground, and have not noticed that it is offensive, although it probably is so. It is a low damp spot, and it has, lately, been found necessary to enlarge it considerably. These spreading cemeteries, (in which, throughout the rains, the rise of water will not permit an earth grave to be dug more than four feet deep) cannot but tend to impest their neighbourhood. That in the Lower Circular Road is, at all times, horribly offensive The instances of Sukkur and Anarkullee will be borne in mind. Sir James Macgregor (as quoted in the Med. Chir. Rev.) relates how the sick in the Hospitals of Cindad Rodrigo suffered from Dysentery, Hospital Gangrene, and Tetanus, and it is interesting to observe that Tetanus is recorded to have disappeared after those sanitary measures which removed the diseases were adopted. "What," says the Reviewer, "was the state of Cindad Rodrigo when it was occupied and made an Hospital Station. Why, shortly before that time, 20,000 bodies had been buried within its walls, within a few months; moreover it was unhealthy independent of this circumstance,"

tions to it are, that it is wanting in ventilation and conveniences of every sort; that both the superficial and deep drainage are insufficient; that it is cramped up, on all sides, by poorly-constructed buildings, with low tiled roofs, which, from deficiency of space within the main building, are occupied as apartments for the sick; that the privies and College dissecting room (erected without due regard to sanitary considerations) obstruct the sea-breeze and pollute the air as it passes through the apartments occupied by the Surgeon of Her Majesty's Regiment and the wards of the Hospital; that a high prison-like wall nearly surrounds the place; that it has, in close contiguity to it, a range of low brothels and grog shops; and, finally, that, in its present condition, it is ill-adapted for the proper classification of the sick, and for the successful treatment of disease."

"A small but ill-adapted range of officers' quarters is attached to the General Hospital where unfortunate officers, who may be devoid of reason, friendless, or disabled from mental or bodily disease, are received and attended to by the officers of the institution. These quarters are so contiguous to the dissecting room of the College, as to be almost uninhabitable, and they are also open to many other objections, which render them quite unsuited for the uses to which they have, hitherto, been applied." * * * *

"The many grave objections which have so often been urged against the present arrangements not only still exist, but have increased. Additional temporary structures have sprung up, and a Native Infirmary, attached to the Hospital last year, has still further crowded an already limited space; the dissecting room of the College is pronounced perfectly offensive; the Hospital privies are unbearable, and the canal and Cooar River, in close proximity to the Hospital, have also become most offensive, partly from the drainage from the General Hospital, and from the low disreputable houses in the neighbourhood."

The committee suggested an excellent and extensive plan for improving the Hospital, having been instructed by Government to "see that every important improvement which has been established by the labours of Miss Nightingale, Mr. Sydney Herbert, and the members of the Army Sanitary Commission, is adopted in the new building." And a sum of sixty-nine thousand six hundred rupees was, immediately, sanctioned, for preliminary works.

Dr. W. L. Macgregor,*—in insisting that, where the sick of either Native or European Regiments are crowded into an Hospital with a low verandah, and with buildings or lofty walls in its vicinity, the consequent exclusion of fresh air quickly exhibits its baneful effects on the sick,—illnstrates his principle strikingly by the fact that in the Hospital occupied by Her Majesty's 3rd Buffs during the season of 1841, at Kurnaul, even so late as the month of November of that year, sloughing followed the application of blisters and leeches;—not in every case where these applications were employed, but where the subject was labouring under a severe disease,—Dysentery or Ptyalism. This invariably happened in his own practice. The like occurred in other Hospitals at the same station. In a Havildar, a blister had been applied to the nape of the neck, and the whole of the integuments and adipose substance were destroyed by sloughing, laying the muscles completely bare. This, however, occurred in September, the unhealthiest period of the year. "*In the Artillery Hospital,*" (an airy building) "*such an occurrence was not witnessed in any one instance.*"

The evil operation of an unhealthy neighbourhood upon sick in Hospital is so forcibly illustrated in the case of the Native (Chaudney) Hospital, in Calcutta, that I must alludo to the circumstance here,—although none but Native patients are treated in this institution.

We have already noticed that, more than 20 years ago, Sir R. Martin noticed the prevalence of Sloughing in this Hospital. In 1854, we find Dr. K. Mackinnon alluding to the fact that wounds made in operating in the Native Hospital, are apt to take on an erysipelatous and sloughing action, especially during the rains. In fact, it would appear that, as far as its history can be traced back, *Hospital Gangrene has been endemic in this building.* That is to say,—while it frequently happens that the most severe scalp wounds, compound fractures, amputations, lithotomy cases, &c, all of which are very numerous here, often recover as well and as rapidly as they could do in any Hospital in the world, (the only drawback being that the scalp wounds, which are extremely common, generally take on an erysipelatous character ranging from a slight evanescent blush of inflammation down to most extensive sphacelus;)—on the other hand, suddenly, as

* *Practical Observations on the Principal Diseases affecting the health of the European and Native Soldiers in the North-West Provinces of India; with a Supplement on Dysentery* 1843.

it would appear from some change of wind or weather, the Surgeon, on paying his morning or his evening visit, will find that nearly every unhealed surface,—ulcers, stumps, wounds which, at the last visit, only presented a thin line of healthy granulations,—have become overspread with a thick tenacious exudation, betokening Gangrene. Some of the least promising these cases do remarkably well, but a large proportion are fatal.

I am indebted to the kindness of my friend Mr. Herbert Baillie, the Officiating Surgeon, and of Dr. Brabazon Booth, the House Surgeon to the institution, for the statistics of the Gangrene prevailing here latterly, for a period of 4 years and a half—1855-59. This table gives a total of 519 surgical operations, in 102 of which cases the issue was fatal. Gangrene attacked 96 of the 519 persons operated on, and 70 of the individuals, thus attacked with Gangrene, died. These statistics do not, of course, includethe many cases in which Gangrene attacked ulcers and accidental wounds.

According to Mr. Godwin, "Hospital Gangrene is never out of the wards of the new surgical part of the Edinburgh Infirmary",—otherwise, I am not acquainted with any modern example which at all parallels that of the Calcutta Native Hospital. It is, therefore, a matter of more than local importance that the causes of this extraordinary endemic should be discovered.

In the winter of 1859, I was requested by my friend, Dr. Allan Webb, Surgeon to the institution, to visit its wards, daily, for a month, and to report the result for the information of the Governors. Dr Webb informed me, at the outset, that what he considered to be true Hospital Gangrene had not made its appearance in his wards since the year 1855; but that, since he had held charge of the Hospital, there had been scarcely any time at which he had not found reason to fear that any case of wound or injury, whether slight or severe, or any patient upon whom a surgical operation had been performed, however favorable in appearance all concurrent circumstances might be, was liable, suddenly, to be attacked with mortification.

On my first visit, (on the 29th January) I saw 31 cases of wound or ulcer. Seven of these patients had undergone surgical operations. In 6 of the 31 cases, the wound or ulcer had a more or less unhealthy character. The nature of these unfavorable cases,—taken together with what I had learnt

from Dr. Webb,—prepared me to believe that, while the generality of wounds do well in the Hospital, ~~may~~ are attended with unhealthy inflammation, tending to Gangrene,—for which the nature and severity of the accidents or operations are insufficient to account. On the evening of the 1st of February (I had, previously, only visited the Hospital in the morning) my attention was drawn, by Dr. Webb, to a sudden and remarkable change for the worse, which came over several of the patients suffering from wounds. They became feverish or had distinct attacks of Intermittent or Remittent Fever, their wounds gaped, were raised and flabby at the edges, or began, at once, to slough.

These portentous changes were, at first, most observable in certain cases of flap wound. Several deaths followed this outbreak, and several cases of rather extensive Gangrene did well,—although their recovery was not rapid.

The *juvantia* and *lædentia* of this Hospital may be briefly summed up and contrasted, as follows :—

The open space round the buildings, although rather confined is well kept. Most of the patients are accommodated on the ground floor, there being only a few small upper rooms to which some of those operated upon, and one or two of the worst cases, are removed, but where they are not secure from the danger of Hospital Gangrene. The wards are not damp, or are very slightly so, are lofty, thoroughly lighted, perfectly clean, and ventilated by numerous large doors and windows. I have never been able to detect any Hospital Smell whatever, on entering the wards. There is no crowding. The patients are, in every way, well lodged, generously dieted, looked after by a large and well trained establishment, and have always been attended by Surgeons second to none in experience, humanity and skill. The patients are chiefly grooms from the large livery stables, and classies and lascars employed on the wharves or in the ships lying in the port. These men are, for the most part, among the healthiest looking and most athletic natives in Calcutta, but a large proportion of them lead very debauched lives, and are habituated to intemperance in the use of spirits and of intoxicating drugs.

On the other hand, as we have already noticed—unless it could be arranged that all medical cases should be rigidly excluded, the building will not allow of any classification of the sick; and, although I believe that an attempt is now made to exclude hopeless Dysentery cases, persons suffering from this disease and from Cholera still gain admission. In a

place like this, there can be no doubt that Dysentery and wound cases are placed in direct antagonism to each other. One who has just undergone amputation, lying near a patient with sloughing Dysentery, is attacked with Hospital Gangrene, and a patient, in the next bed, suffering from simple Dysentery, contracts the sloughing form of the disease, which is, under such circumstances, a true Hospital Gangrene of the large intestine. The Hospital is placed in the centre of a crowded and squalid portion of the Native town, having an extensive market, the Chandney Chowk, full of impurities, immediately to its West,—its outer walls are closely engirt by some of the largest and most offensive open sewers in the place. Directly in front, and to windward, runs the main sewer of that part of the town, which is, here, about three feet wide, and is, in great part, uncovered.* Again, and more especially, at a distance of a few hundred feet, immediately to windward, although separated by a wide road, and concealed by buildings, is an enormous Public Necessary, or Tatty, for Natives, close upon which are extensive ranges of sheds, wherein nearly the whole of the cows which supply central Calcutta with milk are most filthily kept. This scene of widely-spread abomination—as Dr. Webb, and I, sometime since, viewed it from the roof of Mr. Cameron's work-shops,—defies decent description. A sanitary enthusiast, travelling the whole world over in search for a visible source of pestilence, would turn, with handkerchief to face, from this inconceivably beastly prospect ejaculating,—"It is here, it is here."! The wonder is not that, when visited by the prevailing South wind, impested by passing over this enormous sty, many of the patients in the neighbouring Hospital should be attacked with Gangrene,—but that any individual who breathes that poisoned atmosphere, even for a single night, should escape.

The neighbourhood is also closely beset with numerous and extensive stables, of the filthiest description, many

* The pernicious operation, in Hospitals, of an atmosphere impregnated with sewer fumes, has long been recognised. In his "*Suggestions for the Improvement of Hospitals*", published in 1796, (cited by the writer in the Med. Chir. Review already quoted), Sir William Blizard recorded his experience of the danger of selecting the site for an Hospital in proximity to standing water, especially if it is laden with animal filth. Such a state of things proves a source of continuous mischief. He observed that *the influence of sewage exhalation often makes itself strikingly manifest, for its presence often brought about an unfavorable alteration, in a few hours, in the aspect of every sore as well as in the state of nearly every patient, in the Hospital, subjected to its pernicious influence.*

of which appear not to have been thoroughly cleaned for years.

Only too many instances of the absence of even the most ordinary judgment and foresight in the selection of the sites of the older Indian Hospitals might be given. Only one or two need be cited here. We have, already, seen that, at Bangalore, although the place enjoys one of the healthiest and most delightful climates of any occupied by European troops in India, a great deal of disease and a high mortality rate prevailed some twenty years ago. To produce this result, several causes evidently combined, one of the chief of these was an ill-situated and ill-constructed Hospital.

In his annual Report for 1832-33, Surgeon Hamilton of Her Majesty's 39th Regiment stationed there, described the building as follows.* "In this tropical climate, there are several objections to the site and construction of our Hospital.—Its contiguity to the Barrack and sewers. In consequence of the former it is difficult to procure the necessary tranquillity; and the effluvia from the latter is often unwholesomely offensive. Its site being less elevated than the Barracks, the free circulation of air is interrupted. It is surrounded by a wall of equal height to the building, reflecting the sun's heat and opposing ventilation. It contains only two wards of good dimensions, thus preventing the proper classification of diseases, and the means of separating the convalescents from the sick. Lastly, the wards are so narrow that neither tables nor forms can be used at meal hours. "[Bed-boards were used instead]. It is also destitute of proper accomodation for the medical subordinate establishment and hospital serjeant."

The Medical Board's Report shows that, in 1844, the accommodations of this Hospital had been considerably improved. There were, then, separate wards for acute, ophthalmic, and surgical cases, for convalescents, and for women; but we have already shown that, in 1848-9, "the drainage from the Barracks and privies fell all around the Hospital".

We have also seen that the European Hospital, in the Fort at Masulipatam, was "partly self-enclosed by the officers" quarters," and that the bastions of the Fort shut out the access of air to these low buildings within."

Aspect.—It is the opinion of most medical men, of Indian experience, that Hospitals, like Barracks, ought to face the prevailing wind; and that, except in the Hills where it is indis-

* Madras Quarterly Medical Journal, for July 1840.

pensable that they should be properly sheltered, they can scarcely be too thoroughly perflated.—Thus, nearly every medical authority who has reported upon the, otherwise, remarkably good European Hospital for the old Barracks at Dinapore has been loud in his animadversions upon the error of placing it end on to the cool breeze. Among the objectors may be, especially, mentioned Dr. Kenneth Mackinnon, the Medical Board in their Report for 1853-54—and Inspector General G. G. Brown, M.D., in the Diary of his tour in 1859.

Still this question is liable to dispute. In alluding to the structural faults of several of the old Barracks in Madras, we spoke of the belief, generally entertained, that, where buildings are narrow and only ventilated by opposite doors and windows, the frequent entrance of a cold night wind, when the sleepers are bathed in perspiration, is a fertile source of Catarrhs, Rheumatism, and Dysentery. The ill-constructed Hospitals at Bellary and Bangalore were especially open to this objection In the old Madras Reports we find constant allusions to this important point, which appears to require especial attention in that Presidency. Thus, in his Reports for 1838, that excellens officer the late Deputy Inspector General Murray, places foremost among the causes of the "severe and fatal febrile diseases of that Presidency morbid impressions from closeness, owing to want of upper perflation and exposure to currents of air in the Barracks and Guard houses."

In an interesting Report upon the health of Her M.'s 57th. Regiment, in 1838-39, by Mr. A. B. Morgan, attention is emphatically drawn to the faulty construction of the Barracks and Hospital at Cannanore, by the sea-side, on the coast of Malabar. The Barracks are described as built of laterite on an elevated healthy site, within five hundred yards of the sea They were in the form of an irregular quadrangle. The accommodation consisted of eight rooms of unequal sizes, four being two hundred and sixteen feet, and four one hundred and sixty-eight feet in length,—the width of the entire building being twenty, and the height only thirteen feet, surrounded by verandahs no more than six feet in breadth, and seven feet in height. The whole building was roofed with tiles.

The ventilation was "extremely defective, as a Barrack, for a numerous body of men, being dependant upon the doors and windows, which are placed opposite to each other, the latter furnished with iron bars and wooden shutters, but having neither glass nor venetians." "Upon the present construction

of public buildings occupied by the British soldiers in India," Mr. Morgan continues,—"there is no provision made for ventilation, except what is accompanied by thorough drafts, which every one of the most common observation must know to be most dangerous to health :—indeed, I believe this to be the cause of one-half of all the diseases of our soldiers in this presidency."

The principal Hospital building was in the form of a cross. The windows three feet above the level of the ground, the breadth and height of the wards, in the main building, were, uniformly, twenty and seventeen feet respectively, with double verandahs all round.

Here, from June to October, the wind blows constantly from the sea, loaded with fœtid exhalations from putrifying fish, with which the beach is covered. In October, the wind shifts round to the Northward and Eastward and, till February, this wind blows, with great keenness and violence, from the high mountainous range of the Western Ghauts. In the day time, it suffers some abatement, and is succeeded by a moderate and delightful breeze from the sea; but, as the sun sinks, this subsides, and is followed by three or four hours of a treacherous calm, during which the tired soldier is lulled into unsuspicious rest, having thrown himself down, stripped of every incumbrance, as near a door or window as he can, where he falls asleep. At midnight, probably, he is awakened with griping, caused by the furious rushing wind from the ghauts, and roused to seek relief. If, fortunately for him, the symptoms of Dysentery are severe from the first, he applies early for medical aid, and has some chance of recovery; but if, on the contrary, the symptoms are mild, he seeks relief in spiced spirituous drams, and has scarcely a chance of being saved; for it must be borne in mind that the land wind recurs every night, and, when once overtaken with disease, the frequent calls of nature increase his exposure to the cause which first made him ill."

Mr. Morgan urged that—"This exposure will, at once, appear unavoidable under existing circumstances, when it is known that the Barracks are ventilated (*winnowed*,) solely by doors and windows opposite each other, without glass or venetians, the latter being only fitted with wooden shutters. If these are closed at night, death from suffocation must be dreaded; and, if left open, death follows from the thorough draughts." "He spoke from long-directed attention to this subject, and

did not hesitate to declare, that all other causes of disease among the British soldiers in India, (whilst in fixed quarters,) sink into insignificance when compared with this *exposure to nocturnal variations of temperature*; and that the mortality and misery must continue,—what it was then,—FRIGHTFUL,—so long as the guard rooms will not hold the complement of soldiers on duty, and the doors and windows of the Barracks must be left open, at night, to prevent suffocation."

According to Mr. Morgan's observation, Dysentery, at Cannanore, during the prevalence of the land winds, is precisely of the same character as that which has proved so fatal at Secunderabad, among the Royal troops stationed there; and it appeared to him that the source of disease, as well as the chief obstacle to its successful treatment, might be found in the chilly piercing winds which prevail at both these stations, (during the night especially,) for many months of the year.

In his Report upon the Calcutta General Hospital, already cited, Inspector General Dr. McLeod remarked that it was not until about the year 1838 that the doors and windows of the Garrison Hospital building, previously only venetianed, were glazed, at the representation of the Commander-in-Chief. An open verandah, 14 feet broad, had been added to the inner closed verandah in 1825 or 1826. He still, however, found reason to complain of the following defects, dependant upon the original faulty construction of this building. He remarked upon the want of space between the floor and ceiling of both stories, but more especially in the first, where the height does not exceed twelve feet and a half, that of the upper story being only fifteen feet. The want of space over head, he maintained, is totally incompatible with due and regular ventilation in a crowded Hospital, where a strong current of wind is to be avoided, and yet a moderate circulation of air is absolutely necessary. Open doors and windows do not suffice for the due ventilation of a crowded Hospital, unless there be space, within, to allow the heated air to ascend; and, in a climate like this, where a chilly night often succeeds a hot day, the occasions are numerous where the apartments require to be shut up to windward; under such circumstances, he justly argued, a crowded ward with a low roof, becomes prejudicial to health. A blast of cold wind is destructive to patients under various forms of acute disease, and the sense of oppression and suffocation, arising from contaminated and heated air, few persons will submit to who can possibly escape

from it, at whatever risk. It was, therefore, his opinion that, for several months in the year, neither punkahs nor any other means could render this low ward fit for the accommodation of the sick of an European regiment. With regard to the upper story, though still much too low for an Hospital, yet, being so much further removed from the ground, it was less objectionable than the other, and might be made a comfortable ward by certain improvements. The temperature of the upper story, in every flat-roofed house, depends much upon the height of the rooms; and the thermometer, in this ward, had, frequently, stood about ninety degrees, for many days and nights successively, during the hot season.

Though he held the narrowness of the wards (their width being only 17 feet) to be a very great objection, it was, he considered, of less importance than the lowness of the roof. One of the disadvantages, however, of this want of breadth in the wards was, that it deprived the patients of the use of tables and chairs or forms, which no permanent Hospital should be without, "and the patients are, consequently, obliged to eat their meals, sitting on their beds, off the low tepoys, which are intended only for the use of those who are unable to get out of bed."

Previous to this, in 1837, Sir J. R. Martin had advocated the view now under discussion.* He remarked, "So far as I have been able to consider the matter, I am disposed to think that Hospitals, in the Lower Provinces, should face directly East and West," [that is, end on to the prevailing South or South-West breeze,] "with a spacious verandah on these two faces."

"By this arrangement, the convalescents would have complete shade in either verandah, morning and evening, for exercise,—an advantage not possessed under the now-prevalent mode of building, with a Southern and Northern aspect. It may be objected that, by the Eastern and Western aspects, the long face of the buildings will be exposed, morning and evening, to the direct rays of the sun;† but spacious verandahs

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* *Notes on the Medical Topography of Calcutta*, page 66.

† This aspect has to be, invariably, chosen wherever the hot winds prevail, and buildings are cooled by tatties; otherwise, it has been much objected to. Dr. Moseley, (quoted by Hennen) says, from experience in the West Indies, "The aspect of a house may be towards any other quarter than the West, but this will depend on situation in some measure, and the construction of the building. For, if it have only a single roof, in a long narrow range, from North to South, and that the front lie to the

will obviate this." * * * "The selection of the aspect now generally adopted in Bengal, appears to solicit what is called a 'thorough draught,' by means of numerous doors and windows, such being considered necessary to due ventilation. I believe this to be a mistake, and one from which a large portion of sick suffer injury, especially during the cold season, when the strong Northerly current is felt to be very uncomfortable, even to persons in health. The most liberal ventilation should, doubtless, prevail in all Hospitals, but this is best secured, and a lower temperature maintained by space, especially elevation, aspect, &c., and a proper adjustment of doors and windows open down to the floor, with alternate apertures in the upper and lower walls, &c. &c."

While we cannot, here, fully agree with this very high authority, it is certain that his argument had considerable weight at the time when it was recorded,—when many of our European Hospitals, like those at Bangalore and Secunderabad, were narrow low buildings with thin tiled roofs, with shallow inner and no outer verandahs, and with their beds almost touching each other; and, were therefore, for the most part, completely open to the direct draughts from the numerous unglazed and unvenetianed doors and windows. Here, the fault was in the buildings, not in the aspect. A ward of sufficient width and height, with adequate means of ventilation, with deep inner and outer verandahs, the former having glazed and venetianed windows and doors, and the latter being furnished with jhaumps and chicks, to exclude rain and sun, cannot have too many opposite doors, and is never likely to be visited too roughly, in Bengal, by the prevailing North and South winds. In short, there cannot be a question that Hospitals, built as most of our modern ones are, ought to face North and South in Bengal and, generally, East and West Up-country,—unless our Authorities should adopt what I believe would

East, the sun will bear all his force on the largest surface from six to eight in the morning; and, for the same reason, on the West side, from four to six in the evening, and render it excessively hot. If it ranges from East to West, the morning and evening sun will have less surface to act on, and the building must, necessarily, be cooler; as the meridional sun acts nearly the same on the roof, let it be placed how it may. But the East should not be excluded on account of the breeze, and of the afternoon shade and coolness. Then, if the building be single, a North front with windows, piazzas and balcony to the East and South, have the advantage. But, if the building be large and double, an East front is, on the whole, the best plan for a house."

prove to be the very economical and salutary arrangement, of cooling the Up-country Hospitals constantly, throughout the hot season, by well constructed Thermantidotes, worked by a small Steam Engine, which might also be employed in supplying the buildings with water at high pressure; in which case, the clumsy, expensive, and often inadequate tatty and punkah system might be dispensed with;—then, it would become necessary to place the buildings end on to the direction whence the hot wind blows.

Construction.

Under this head, the subject of *Temporary Hospitals* demands attention.

A multitude of instances may be adduced in proof of the fact that there are many circumstances under which sick and wounded may be treated in Tents and Huts with great advantage.*

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* Pringle and Brocklesby both adduced evidence in support of the principle that the sick of armies recover better in well-constructed Huts than in bad Regimental and overcrowded General Hospitals.

Lind mentions, in his work on the Diseases of Seamen, that, when the Hospital Fever was brought from England to Port Mahon, the house being found insufficient for so great a number of sick, tents were reared up in the fields for many of the men. These poor fellows were thought to be badly accommodated, but it was very observable that most of those who lay in the cold tents recovered;—when the mortality in the house was so great that, in some wards, not one in three escaped.

So also, in his account of the Epidemic Fever which prevailed in Edinburgh during the year 1847-48, (Edinburgh Med. and Surgical Journal, No. 177, as cited in the Medico Chirurgical Review) Dr. Robert Patterson shows that the treatment of Fever, in Sheds and Tents, gave much less mortality in them than in the Hospital. In the Hospital it averaged 15·42 per cent. for males, and 10·03 for females; while, in the Sheds and Tents, the mortality, for males, was 12 per cent., and that for females, 7 per cent. The Sheds were three in number, and all differently constructed, and the Reviewer remarks that it is curious to notice how the favorable results were the more apparent just as the position of the Shed was more open to the influence of fresh air. The most successful treatment was in a Shed one hundred and ninety-two feet long, which the managers of the Hospital, at the wise suggestion of Dr. Patterson, divided into three compartments, so as to make three Sheds of it, separate from each other, with a separate door to each compartment. It was erected on an open space of ground; it had windows on both sides and opposite each other, with ventilators in the floor and roof. Thus, there was perfect ventilation, and the mortality was only nine per cent. In the large circular tents, the mortality was only 5 [?] per cent., that of Hospital being 10 per cent., on the same class of cases.

This applies especially to the treatment of severe pestilential outbreaks, both in Europe and in India. It has been found, in some of our most trying campaigns in this country, that the sick and wounded have done as well under canvass as they could possibly do in any Hospital—(although this has not been, by any means, uniformly the case)—and, during the mild winters of the plains, medical officers have no hesitation in placing their sick in Tents while Hospitals are undergoing repairs, &c. Still,—without insisting upon extreme facts like that observed by Pringle, of the generation of Typhus in ill-ventilated Tents; and that noticed by Benjamin Rush,* that troops are most healthy when the exigencies of a campaign have made it necessary for an army to send off their Tents, which he attributes to the Tents being rendered unhealthy by being too much crowded, or from not being kept clean, these being, self-evidently, the results of bad management,—every practical officer knows that insubstantial buildings, which will exclude neither the heat nor the cold, cannot, without detriment, be permanently occupied by troops, whether in sickness or in health.

Thus, we are told by Hennen that he was convinced that the unhealthiness of Vido (Corfu) had been, principally, owing to the excessive changes of temperature, experienced by the troops quartered in the wooden barracks, which were intolerably hot in the day, and piercingly cold at night. Dr. Benza found the thermometer six degrees higher in the sheds of Vido than in the hottest quarters of Corfu; and, while the men in the sheds were extremely sickly, those in the adjoining bomb-proofs sent but very few men to Hospital, and all slight cases.

In short, while the Army Surgeon should fully recognise the advantages of Temporary Hospitals and avail himself of every means by which they can be made the best use of, it is, undoubtedly, his duty—immediately the necessity has ceased—never to cease protesting while the health of his men is unduly tried by exposing them in flimsy unsubstantial buildings.†

New Hospitals.—Are always to be looked upon with some degree of suspicion. We have, already, alluded to the observa-

* *Directions for Preserving the Health of Soldiers; addressed to the Officers of the Army of the United States.*

† On this subject, vide the remarks on *Temporary Barracks*, page 398.

tion that surgical cases cannot be treated in the new wards at Guy's—which, however, appears to be consequent, mainly, upon faulty construction and deficient ventilation; to the fact that the Middlesex Hospital was, notoriously, unhealthy while still a new building; and to the mysterious prevalence of Puerperal Fever in the recently erected Obstetric Institution at Wurtzburg. Mr. Spencer Wells remarked, some time ago, at the Medico Chirurgical Society, that, in Paris, at the Necker Hospital, there were some old-fashioned buildings with small rooms, dark, and not well ventilated, not at all the kind of buildings one would think desirable for an Hospital. Subsequently, they had erected some new buildings in connexion with that Hospital, constructed on the most improved modern principles, as regards ventilation, heating, &c., and with much larger rooms, similar to the new rooms at Guy's. But it was shown, a few years ago, by M. Trousseau, that the mortality was greater in the new buildings than in the old. Certainly this was explained, partly, by the artificial system of ventilation and, partly, by the fact of so many patients being in one ward.

Some years ago, an acquaintance of mine happened to return, earlier than he had expected, to his house at Barrackpore, which had been thoroughly repaired during his absence. He slept in it unwillingly, one night; and, in the morning, was attacked with dangerous illness, the first symptom of which was double vision —his dressing glass, his orderly, his horse, all appeared double. I believe, however, that this was, mainly, the effect of lead-poisoning.

The same suspicion has been attached to new ships. Blane speaks of the Infectious Ship Fever, as "the disease of ships newly-fitted out." Elsewhere, however, he mentions it as a remarkable fact, that the *Montagu*, "though this was her first voyage, and though she was just off the stocks, had been most healthy of any of the five ships of the six which joined Lord Rodney's Squadron at Barbadoes in March 1780." He "had not observed that new ships are more unhealthy than others, unless they are built of ill-seasoned timber, and they have this advantage, that there is no previous infection adhering to them." He also mentions the *Belliqueux* which, although threatened with a Dysentery, soon became healthy and remained so. "This," he adds, "is the second instance we have had occasion to remark of a new ship being healthy."—The opinion to the contrary was, evidently, very prevalent.

Dr. Trotter mentions that when the *Arrogant*, with a new raised crew, joined Lord Howe's Fleet at Spithead in 1794, from the Nore, her decks and beams were remarkable for their moisture, which seemed to exhale from the timber. The Purser had been ill from rheumatism, which he ascribed entirely to this cause. He had, for some time, observed the damp vapour on his bed clothes every morning. It had also affected the ship's company; and a kind of irregular Intermittent was prevalent among the landsmen on board. Dr. Trotter considered that this uncommon dampness of the *Arrogant's* timbers was, probably, very much owing to the spot where she lay in ordinary being surrounded with swamps, or that it might be in consequence of her having been built of green wood.

We are told* that houses, how long-so-ever they may have been built, though exposed, for years, to the action of dry air, are unhealthy when first inhabited. The lime of the dry hydrate of the mortar of the walls combines with the carbonic acid abundantly supplied by the lungs and skin of their first occupants, and parts with and sets free, as moisture, the 24 per cent. of water chemically combined with it. The water, thus displaced, speedily evaporates and saturates the atmosphere of the various rooms, its excess being condensed, in drops, on the windows and cold walls. This does not depend on the ordinary moisture or dampness of the walls, but on the retained water of the hydrate, and must, invariably, occur on the first occupancy of any building into the walls of which lime enters.

Dr. Roscoe attributes the unhealthiness of new and damp houses, partly to the absence of all diffusive interchange, through the wet walls, between the carbonic acid gas of the apartments, and the external atmosphere.

The Proper Size of Hospitals.—Is a very important question, the leading points of which have, already, been discussed in the Chapter on Barracks.

Pringle was one of the first who recognised the ill effects of massing together great bodies of sick in Regimental General Hospitals, thereby generating an *Hospital Atmosphere*,—whence his recommendation of separate Regimental Infirmaries. Brocklesby maintained that huts, for small numbers (forty to one hundred and twenty), are much better than large

* Liebig's Familiar Letters, page 340, quoted by Pickford.

hospitals. In 1791, Mr. Stewart Henderson, Apothecary to H. M.'s Forces, was so convinced of the necessity of isolating the sick, and of the necessity of preventing the possibility of a common infection or Hospital Air, that he carried the principle of isolation to the impracticable extreme of giving each patient, in an hospital for 700 sick, a separate apartment 7 × 8 feet, and 10 feet high, with a window over its door, and a window on the side opposite the door. These little Hospitals were to be erected at four feet distance from each other, and to be arranged in street rows of twenty feet apart. For convalescents, the houses were to be 120 feet long, 18 feet broad, and fourteen feet high, with separate doors to each, opening into the street.*

In describing the Malignant Ulcer of the Fleet, Blane emphatically remarked, "The primary objects of attention should be ventilation, cleanliness, and separation. It is very rarely this infection exists but in *large* ships, or in the wards of Hospitals, where there are *a considerable number in one apartment*, producing a concentrated effluvium, and the most important point is, that there should be as few as possible within each others' atmosphere."

Dr. Hawkins observed that a large Hospital is, usually, less favorable to health than a small one, and that "it would, probably, be found, on observation, that a large *ward*, in any Hospital, is less healthy than a small one."

"These tendencies may", he allows, "be, occasionally, retarded by particular exertions to counteract them, but the principle will remain unimpaired. Perhaps it might be useful to preserve these facts in view, in the construction of new Hospitals: a city would be better served by several small Hospitals than by a few large ones, without alluding to the greater convenience of transport, visits, and study. He added that, "In the Provincial Hospitals of the Kingdom, the mortality will be, generally, found lower than in the Metropolitan, which will also be seen to occur in France and Germany. This circumstance is owing to the smaller population of the town, and to the usually smaller size of the Hospital."

Dr. Robert Jackson insisted that "Height of roof is a property of great importance in a house that is appropriated to the reception of the sick of armies; for the air being contaminated by the breathings of a crowd of people in con-

* British and Foreign Medico Chirargical Review for April 1860, ut supra cit.

fined space, the disease is aggravated and mortality is multiplied to an extraordinary extent. It was often proved, in the history of the late war, that more human life was destroyed in accumulating sick men in low and ill-ventilated apartments, than in leaving them exposed to severe and inclement weather at the side of a hedge or common dyke. It is fit that the Military Officer mark this fact and bear it in mind; and it is also fit that he bear in mind that Churches and Palaces are less proper receptacles of military sick, than Barns Hovels, and Open Sheds."*

Now, this may be regarded as an established sanitary law, recognised by our first authorities

Dr. Simpson remarks—"We know that, when all precautions as to placing surgical patients in abundance of free and fresh air are set at nought, and when many are crowded together in a small ward, the worst forms of Surgical Fever, with Hospital Gangrene, spread rapidly among the unhappy inmates. You can, thus, create and manufacture the disease almost at will, by directly disregarding and neglecting all cleanliness and purity of air; and it may yet come to be a question whether you should not give, on the contrary, our surgical patients a greater chance of escape by changing our large Hospitals into villages, and the palaces of which they consist into cottages, than by adhering to the present system of erecting, for their reception, houses built with wards above wards."

Miss Nightingale maintains that, if any thing were wanting in confirmation of this principle, it would be "the enormous mortality in the Hospitals which contained perhaps the largest number of sick ever, at one time, under the same roof, *viz.*, those at Scutari. The largest of these two famous Hospitals had, at one time, 2500 sick and wounded under its roof, and it has happened that, of Scutari patients, two out of every five have died. In the Hospital Tents of the Crimea, although the sick were almost without shelter, without blankets; without proper food or medicines, the mortality was not above half what it was at Scutari. Nor was it ever so high as this in the small Balaclava General Hospital; while, in the huts of the Castle Hospital, on the heights above Balaclava, at a subsequent period, the mortality among the wounded did not reach three per cent." It is not to this, however," Miss Nightingale adds, "that we appeal, as the only proof

* Op. citat p. 422.

of the danger of surface over-crowding. It is to the fact of eighty cases of Hospital Gangrene having been recorded during one month, at Scutari (and many, many more unrecorded) to the fact that, out of 44 secondary ampatations of the lower extremities, consecutively performed, 36 died; and to the cases of fever which broke out in the Hospital, not by tens, but by hundreds."

In carrying on this argument, Mr. Godwin insists that "The lesson taught by all experience is, that large Hospitals, as generally built and managed, are destructive of human life, unless extraordinary precautions be taken, and that it would be safer, as a general rule, in the absence of such precautions, to treat large numbers of sick in the open air. "But we *must* have Hospitals, and it is only by sub-division of the sick among a number of separate buildings, by relatively large cubic space, and by ample ventilation, that we can make Hospitals furnish a minimum rate of mortality, and a minimum duration of cases."*

* In one of his recent Reports, to the Inspector General of Jails Lower Provinces, Dr. Mountjoy, of Akyab, has stated this view of the question, in its application to Indian buildings, so graphically, that I cannot refrain from quoting the following passage.

"The ventilation" (of the Akyab Jail) "is excellent, simply because the wards are built of bamboos and leaves, through the wide crevices of which the wind whistles and circulates freely. Nature's idea of a house is a tree. The branches furnish benches for the birds to rest upon, and the leaves afford shelter and protection, without interfering with the free circulation of air around, and through every leafy chamber. Man, in his usual vain search after improvement, will persist in building stone palaces to lodge bodies of men in the tropics; and, if the edifice is intended for a Barrack, or a Hospital, wards above wards are built, at a great expense of money, to result in a great expense of life; contrivances are fashioned for shutting out the night air, and, of course, keeping in the exhalation arising from the sleeping men; and, then, when morning comes, the windows are opened, and the pleasant breeze is admitted into the ward, the space of which Scientific Engineers have calculated to be able to afford a certain number of cubic feet to each occupant. So the broad belt of atmosphere which the creator has so bountifully given to birds and beasts, which under the guidance of their uneducated instincts, consume it without stint or limit, is, apparently, considered to be either so noxious, or so scarce and precious, by science, that it must be doled out by the cubic foot, to the well-cared for inmates of our Hospitals and our Barracks. Fortunately, our Akyab Jail wards have not been scientifically built,—one can walk through them, fresh out of the morning air, without perceiving any trace of that peculiar odour, for which I know no better term than that by which it is often designated, *viz.* "Bedroom Smell" I wish the new Hospital had been constructed of leaves and bamboos instead of closely fitting planks" * * * "a disagreeable Hospital smell always pervades the building."

It, fortunately, happens that, in India, very large permanent Hospitals are not required, except at the three Presedency Towns. At the principal military stations in Bengal, (with the exception of Allahabad, where there is now a General Hospital) the largest Hospitals are for the sick of a regiment, calculated at fifteen per cent. Except, therefore, at very unhealthy stations, like Peshawur, an Hospital capable of receiving one hundred and fifty or sixty patients, without placing any sick in its inner verandahs, is sufficient to meet our wants.

Due Allowance of Superficial and Cubic Space.—No medical officer requires to be warned of the danger of overcrowding, an Hospital; but, while Hospitals continue to be overcrowded under circumstances which the medical attendants are unable to control, and while many, out of the profession, do not recognise this danger, or are unable to detect it, when they enter a neat well arranged ward, where forty sick occupy a space scarcely sufficient for twenty, the threadbare arguments and trite illustrations of the evil in question cannot be altogether omitted from an elementary work like ours.

We by no means coincide with Dr. Mountjoy to the full extent of his argument, still the principle which he advocates is, in the main, very applicable to Indian Jails, especially in that part of the country,—the Eastern Coast. I believe it to be an invariable principle that the plan of a Barrack, Hospital or Jail cannot be good, in a sanitary point of view, unless it be a judicious adaptation of the style of dwellings in which the inmates have been accustomed to reside. In Akyab, Chittagong and Nowacolly, the natives mostly inhabit huts of cane, bamboo, and thatch; in Calcutta and its neighbourhood, they live in mud huts, comparatively ill-ventilated. The former die in large numbers of Dysentery and Jail Diarrhœa when shut up in brick jails; and I have often felt, when I have seen the latter lying in the magnificent wards of the Medical College Hospital, with the cold morning breeze rushing in through the intercolumniations, upon their naked bodies, that they were ill accommodated.

It is very remarkable that while,—during ten years 1845-54,—the average mortality rate, in sixty one Bengal Jails, was 69·8 per 1,000, the decennial death rates in Nowacolly Jail was, 21·5, being the lowest in the Province.

Still Nowacolly is not considered a healthy place. It is very malarious. A large proportion of its native inhabitants suffer from splenic disease. During the ten years in question, Epidemic Cholera invaded this jail four times, and destroyed from 0·58 to 3·88 per cent. of the prisoners Still the annual mortality, here, has often fallen below 15 per thousand.

The comparative great healthiness of this Jail has long been a matter of notoriety among civil officers in Bengal, and has generally been attributed altogether to the fact, that the wards are wholly constructed of mat and thatch, like the natives' houses.

Whenever we can attained such perfection in the construction of our hospitals, as to carry out Miss Nightingale's Maxim in the treatment of

One who wrote at the commencement of the present Century,* observed that, "In crowded Hospitals, the exhalations from the lungs and bodies of men in fevers, the emanations from wounds, gangrenous parts, and carious bones, besides the vapours arising from the beds and other *sources*, show the necessity for the frequent renewal of the air. The air, thus impregnated, frequently produces melancholy effects. We see Ulcers, which wore a healthy aspect, become spongy and gleety; amputated stumps deluged with matter; *and Fevers, originally intermittent or remittent, assuming all the symptoms of typhus gravior.* This alone ought to point out the necessity of making a timely separation of these cases, and of adopting every means in our power of preventing this dreadful catastrophy."

Roederer (1722, as cited by Harty) has given a very suggestive account of a malignant contagious form of Dysentery, which he termed "Febris Mucosa Acuta Maligna,"† as principally prevailing in the Camps and Military Hospitals of a town that was beseiged and reduced to great distress from a scarcity of provisions, and the immense multitudes crowded within its walls.

The Hospitals were, literally, crammed with the sick, and the whole town was little more than a Hospital. There were many surgical and other patients in the Hospitals, besides those labouring under Dysentery; and, as this latter disease spread among them, he describes the effects it produced on the various maladies that thus became combined with it. He says,—"Vulnerati quovis modo omnes fere, liceat antea fuerint sanissimi, ex mucosi epidemici connubio, citiùs lentiùsve succubuerunt. Pro gravitate vulneris accenditur febris acuta, ex inflammatione paratur pus mali moris, fœtens, ichorosum, sequitur gangrena, juncto simul symptomatum febris mucosæ acutæ malignæ, plus minus biliosæ, inflammatoriæ, putridæ satellitio." * * * "Eadem fere sors fuit præfectorum in

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the sick, "*To keep the air he breathes as pure as the external air without chilling him,*" the just mean for which we are all striving, in India and at Home, will have been obtained;—but *hic labor hoc opus est.*

* *Observations on the Means of Preserving the Health of Soldiers and Sailors, and on the Duties of the Medical Department of the Armŷ and Navy. With Remarks on Hospitals and their Internal Arrangement,*—by Edward Cutbush, M. D. of the Navy of the United States, Philadelphia, 1808.

† Pringle was also of opinion that the effluvia from Dysenteric fæces may propagate Dysentery, and that such effluvia may even generate a Fever peculiar to Hospitals and Jails, when large numbers of sick are confined in them. We have, already, quoted Zimmermann to the same effect.

urbe ex vulneribus ægrotantium, ac militis gregarii in nosocomiis" * * "Non temerè quisquam vel lene quoddam vulnus, per se in corpore sano facilè coaliturum, sive ex infortunio, sive ex operatoris manu inflictum, sustinuit, quin accedente febre mucosâ, in discrimine vitæ fuerit versatus. Sub operatione, aut ex venâ sectâ profluit sanguis tenuis, ingratè ruber, levitèr fuscus, laudabili indole gelatinosâ, glutine et consistentiâ destitutus, diffluens, justò dilutior, ægrè coit in placentam, multo sero circumfusam, tenui crustâ inflammatoriâ tectam. Ipsa vulnuscula phlebotomo inflicta ægrè consolidantur, et post plures dies, madida labia vulnusculi adhuc dehiscunt."

The importance of these passages, in their applicability to Indian Hospitals, must be self-evident.

Some indications have, already, been given, in these pages, of the manner in which disease is liable to be concentrated and aggravated, and then to spread in overcrowded and ill-ventilated Indian Hospitals. We have seen that, in the Citadel of Lahore, in 1849-50, extreme overcrowding changed the type of a Fever of malarious origin, gave it a typhoid character and rendered it deadly; and that, in the overcrowded Regimental Hospitals in Burmah, during the last War, Fever ran into Dysentery, and Dysentery became Phagedœnic Hæmorrhagic and Contagious.

In this country, there are certain diseases which are especially liable to attack the sick in crowded, ill-ventilated, or ill-constructed Hospitals. The chief of these are Cholera and Insolation.

In 1835, the station of Hazareebaugh, then very recently occupied by European troops, was visited by Cholera. The Public buildings had not been completed. The Native labourers, employed upon them—being exposed all day in their several occupations, and compelled to sleep in small huts generally crowded to excess, from the immense influx of strangers required by Government for the completion of the works—suffered very severely. In H. M.'s 49th Regiment, the first fatal case, at the commencement of the epidemic, happened to a man in Hospital, and no fewer than seven patients, under treatment for various diseases, were seized during the prevalence of the epidemic, several of whom died. Dr. French attributed this occurrence, in part, to the ill-protected state of the Hospital wards, which were not furnished with glass doors or windows. "Without which," Dr. French remarked, "to a building

appropriated for the reception of Europeans labouring under sickness at a station of that elevation, or, in fact, at any place where changes of temperature are considerable and sudden, at particular seasons, no fair or satisfactory conclusion can be arrived at in regard to a practitioner's success in the treatment of disease."* Many similar instances might be cited.

In his Annual Report of the Jullundur circle for 1852-53, Superintending Surgeon Corbyn mentioned that, at Peshawur, on the 13th August 1849, about 2 P. M., four men of the Battalion, whilst lying in their beds in Hospital, were attacked with Heat Apoplexy within a few minutes of each other, and several other men, in the wards, showed most threatening symptoms of it, requiring unremitting care and attention, for three hours, to keep off the threatened seizure. The external air was still sultry and moist, and the thermometer stood, from 2 till 5 P. M., at 100°, which was a degree or two higher than it had been before during the month, the usual height having been 97° or 98°, when no case of Apoplexy occurred. Three of the four men attacked died. A recurrence was dreaded next day, but a thunder-storm put an end to these cases, for the season, though not before some men of the Bombay Fusiliers had been struck down, in Hospital, on the other side of the cantonment.

In commenting upon these facts, Dr. Corbyn insisted strongly upon the necessity of allowing thorough ventilation, and of employing Thermantidotes in Hospitals. He remarked that, "Besides contributing greatly to the comfort of the sick, this would be of inestimable advantage in promoting their recovery, and would, doubtless, be the means of directly saving many lives, for it is at these times, *and chiefly among patients in Hospital*, that the numerous fatal cases of Apoplexy occur, from high temperature and impure air."

Three separate instances of sick men, fatally attacked, in their beds, with Insolation, have come within my own personal observation. I do not, however, believe that bad ventilation had any concern in the production of these cases, one of which occurred in a patient who lay alone in one of the finest rooms in India. Where, however, there is such a proclivity to this disease among the sick, however favorably circumstanced, the necessity o preventing overcrowding and

* Madras Quarterly Medical Journal, vol. 2, p. 436.

of providing free ventilation need scarcely be insisted upon.

Deputy Inspector General Dr. Wilson mentions, in his Report on the Peshawur circle, that thirteen cases of Insolation occurred in 1858, in a detachment of H. M.'s 98th Regiment, posted in the Fort of Attock. Of these, eleven were fatal. Dr. Wilson remarks that it is worthy of note that, in the cases of seizure, in all of which the issue was fatal, the disease attacked men who were, at the time, patients under treatment in Hospital, suffering chiefly from Fever. During the months of July and August, when almost all the cases occurred, the heat was oppressive, the thermometer ranging as high as 108 and 110, and there was complete stagnation of the atmosphere. "*Moreover the Hospital appears to have been crowded, and the building in use was a close ill-ventilated place.*"

The Cubic and Superficial Space allowed in Indian Hospitals.

It is now laid down in the Medical Regulations of H. M.'s British army that,—"The minimum space to be allowed for each bed in any permanent Hospital shall be 1,200 cubic feet at home and at stations in temperate climates, and 1,500 cubic feet at stations in tropical climates."*

"The number of beds which each ward is capable of containing, in accordance with these measurements, shall be painted outside the door of the ward, and the number of beds shall not be increased beyond the number so specified, without the sanction of the Secretary of State. In detached wooden huts, in temperate climates, the minimum of space is to be 600 cubic feet per bed, and the number of beds, per hut, is also to be painted on the door."

The following is an Abstract of the Returns of the Admeasurements of each ward in the Permanent and Temporary Hospital Buildings occupied by European troops late in 1859, throughout the Bengal Presidency, as obtained by Dr. Forsyth, Principal Inspector General of the Medical Department.

The remark which I made with regard to the Barrack Admeasurements, *viz.*, that they do not fairly represent the manner in which our troops are accommodated, having been collected at a timewhen it had been found impossible to provide appropriate

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* "The amount of cubic space per bed, in this Regulation, must be given in all permanent Hospitals where the accommodation admits of it. When Hospitals are not fully occupied, the sick must be distributed so as to give, as nearly as may be, the amount specified. In all new or enlarged Hospitals, the full amount will be given.

buildings for the whole of the great army who had come to our aid in the time of the mutinies,—applies to these of the Hospitals. Still they show tolerably liberal averages.

	Average cubic space per man.	Average superficial space per man.
Temporary Hospitals, ...	1476	93
Permanent Hospitals, ...	1390	79
Average, ...	1422	84

It will be borne in mind that, for the most part, these buildings are exceedingly well ventilated.

Measurement of each Ward in the Permanent Hospitals.

Name or Number of Word.	Regiments.	Stations.	Cubic Space for each Patient.	Superficial Space for each Patient.
No. 8	1st Bn. H. M.'s 13th Lt. Infantry, ...	Goruckpore, ...	486	40½
No. 12	Ditto ditto, ...	Ditto, ...	486	40½
No. 4	Dett. H. M.'s 13th Lt. Infantry, ...	Bustee near Goruckpore, ...	645	40
Nos. 11 12 & 13 each.	H. M.'s 6th Regiment, ...	Sydaree Ghaut (Azimghur),...	672	56
No. 11	1st Bn. H. M.'s 13th Lt. Infantry, ...	Goruckpore, ...	720	60
No. 4	Rt Wg. 5th By. 14th Brig. Rl. Artillery, ...	Ditto, ...	720	72
No. 5	Ditto ditto, ...	Ditto, ...	720	72
———	1st European Lt. Cavy.,	Cawnpore, ...	733	30
Female Wards	Invalid Battalion, ...	Chunar, ...	797	51
No. 2	Rt. Wg. 5th By. 14th Brig. Rl. Artillery, ...	Goruckpore, ...	798	57
No. 3	1st Bn. H. M.'s 13th Lt. Infantry, ...	Ditto, ...	823	55
———	Depôt Hospital,...	Cawnpore, ...	834	35
No. 9	1st Bn. H. M.'s 13th Lt. Infantry, ...	Goruckpore, ...	845	54
No. 6	Dett. H. M.'s 13th Lt. Infantry, ...	Bustee near Goruckpore, ...	914	57
No. 4 & 5 each	H. M.'s 6th Regiment, ...	Sydaree Ghaut (Azimghur),	920	46
No. 1	H. M.'s 37th Regiment,	Ghazeepore, ...	972	97
No. 2	1st Bn. H. M.'s 13th Lt. Infantry, ...	Goruckpore, ...	972	81
No. 4	Ditto ditto, ...	Ditto, ...	972	81
———	Dett. of Indian Naval Bde. No. 3, ...	Buxar,...	982	89
No. 1	Rt. Wg. 5th By. 14th Brig. Ry. Artillery, ...	Goruckpore, ...	1008	72

Measurement of each Ward in the Permanent Hospitals.—(Continued.)

Name or Number of Ward.	Regiments.	Stations.	Cubic Space for each Patient.	Superficial Space for each Patient.
No. 1	1st Bn. H. M.'s 13th Lt. Infanty, ...	Ditto, ...	1080	90
Nos. 5 & 7 each	Ditto ditto, ...	Ditto, ...	1080	90
No. 13	Ditto ditto, ...	Ditto, ...	1080	90
No. 9	Dett. H. M.'s 13th Lt. Infantry, ...	Bustee near Goruckpore, ...	1080	90
No. 15	1st Bn. H. M.'s 13th Lt. Infantry, ...	Goruckpore, ...	1082	60
No. 7	Dett. H. M.'s 13th Lt. Infy.	Bustee near Goruckpore, ...	1088	68
No. 2 & 3 ea.	H. M.'s 6th Regiment,	Sydaree Ghaut (Azimghur),	1100	55
No. 2	Dett. H. M.'s 13th Lt. Infy., ...	Bustee near Goruckpore, ...	1102	79
No. 8	Ditto ditto, ...	Ditto, ...	1120	70
No. 3 Room	Artillery Division, ...	Delhie, ...	1188	66
No. 3	Rt. Wg. 5th By. 14th Brig. Rl. Artillery, ...	Goruckpore, ...	1197	85
No. 10	H. M.'s 6th Regiment, ...	Sydaree Ghaut (Azimghur), ...	1200	60
No. 1	Ditto ditto, ...	Ditto, ...	1260	42
Nos. 2 & ends	Hd. Qrs. H. M.'s 92nd Highlanders, ...	Jhansi, ...	1275	50
No. 10	1st Bn. H. M.'s 13th Lt. Infy.	Goruckpore, ...	1296	81
No. 1 Dwelling House. No. 3	H. M.'s 46th Regiment,	Mooltan, ...	1296	72
Nos. 6, 7, 8 & 9 ea.	H. M.'s 6th Regiment, ...	Sydaree Ghaut (Azimghur),	1320	66
Centre Word Upper floor.	General Hospital, ...	Presidency, ..	1397	77
———	H. M.'s 90th Lt. Infy, ...	Seetapore, ...	1431	51

Measurement of each Ward in the Permanent Hospitals.—(Continued)

Name or Number of Ward.	Regiments.	Stations.	Cubic Space for each Patient.	Superficial Space for each Patient.
No. 6	1st Bn. H. M.'s 13th Lt. Infy., ...	Goruckpore, ...	1440	90
Nos. 7 & 8 ea.	Dett. H. M.'s 13th Lt. Infy., ...	Azimghur, ...	1444	76
No. 1 Dwelling House. } No. 2	H. M.'s 46th Regiment,	Mooltan, ...	1458	81
Centre Ward Lower floor.	General Hospital, ...	Presidency,... ...	1482	82
No. 4	Dett. H. M.'s 13th Lt. Infy., ...	Azimghur, ...	1493	78
———	6th By. 14th Brig. Rl. Artillery, ...	Rae Bareilly, ...	1508	75
No. 5	Dett. H. M.'s 13th Lt. Infy., ...	Azimghur, ...	1520	80
No. 1 Dwelling House. } No. 1	H. M.'s 46th Regiment, ...	Mooltan, ...	1555	86
———	F. Batty H. Brig. R. Arty.	Meerut, ...	1560	78
No. 4 Room	Artillery Division, ...	Delhie, ...	1584	88
Old Native Hospital } No. 2	H. M.'s 46th Regiment, ...	Mooltan, ...	1646	103
Lower floor	Garrison Hospital, ...	Presidency,... ...	1651	138
———	Depôt Hospital European Troops, ...	Dinapore, ...	1680	84
Nos. 1 & 3	Hd. Qrs. H. M.'s 92nd Highlanders, ...	Jhansi, ...	1719	61
Native Hospital	H. M.'s 7th Dragoon Guards, ...	Sealkote, ...	1858	93
———	General Depôt Hospital, ...	Allahabad, ...	1939	125
No. 1	Dett. H. M.'s 13th Lt. Infantry, ...	Bustee near Goruckpore, ...	1962	122

Measurement of each Ward in the Permanent Hospitals.—(Continued)

Name or Number of Ward.	Regiments.	Stations.	Cubic Space for each Patient.	Superficial Space for each Patient.
Female Hospital	H. M.'s 7th Dragoon Guards, ...	Sealkote, ...	2089	85
———	Dett. 1st Bn. 6th Regt.,	Buxar,...	2098	116
Nos. 2 & 3 each	H. M.'s 80th Regiment,	Cawnpore, ...	2107	93
———	H. M.'s 5th En. and 73rd Regts.,...	Berhampore,... ...	2145	110
Upper floor	Garrison Hospital, ...	Presidency,... ...	2154	143½
Nos. 8 & 9 each	H. M.'s 80th Regiment,	Cawnpore, ...	2157	100
———	H. M.'s 17th Lancers, ...	Morar,...	2199	116
Nos. 5 & 6 each	H. M.'s 80th Regiment, ...	Cawnpore, ...	2207	103
———	H. M.'s 34th Regiment, ...	Fyzabad, ...	2217	105
No. 6	Dett. H. M.'s 13th Lt. Infantry, ...	Azimghur, ...	2280	120
———	H. M.'s 94th Regiment, ...	Peshawur, ...	2291	85
Nos. 1 to 3 each	H. M.'s 20th Regiment, ...	Gondah, ...	2329	93
No. 14	1st Bn. H. M.'s 13th Lt. Infantry, ...	Goruckpore, ...	2376	132
Male Ward	Head Qrs. and 3rd Co. 6th Bn. and 3rd Co. 2nd Bn. F. Arty., ...	Peshawur	2475	99

Measurement of each Ward in the Temporary Hospitals.

Name or Number of Ward.	Regiments.	Stations.	Cubic space for each Patient.	Superficial space for each Patient.
1 Hut	H. M.'s 89th Regiment, ...	Camp near Seronge,	394	23
No. 3	H. M.'s 97th Regiment, ...	Banda, ...	617	77
———	Dett. H. M.'s 77th Regt,...	Camp Sasseram,	673	71
East Hospital } No. 2	H. M.'s 88th Regiment, ...	Delhie,...	676	101
———	Depôt of European Troops,	Raneegunge, ...	805	47
No. 1	4th Co. Royal Engineers,...	Moosabagh, ...	827	41
Nos. 2 & 3 each	Dett. H. M.'s 89th Regt.,	Goonah, ...	840	56
No. 1	Ditto ditto, ...	Ditto, ...	972	54
No. 6	H. M.'s 97th Regiment, ...	Banda,...	977	51
No. 2	H. M.'s 97th Regiment, ...	Ditto, ...	1008	144
———	Dett. H. M.'s 97th Regt.,	Nowgong, ...	1066	76
No. 5	H. M.'s 97th Regiment, ...	Banda, ...	1080	60
No. 1	Ditto ditto,...	Ditto, ...	1166	65
Nos. 4 & 5 each	Dett. H. M.'s 89th Regt.,	Goonah, ...	1344	96
No. 2	H. M.'s 37th Regt.,... ...	Ghazeepore, ...	1348	87
No. 3	Ditto ditto,...	Ditto, ...	1407	91
———	Dett. H. M.'s 77th Regt.,	Dehree, ...	1426	73
West Hospital } No. 8	H. M.'s 88th Regt., ...	Delhie,...	1454	83
———	H. M.'s 3rd By. 14th Brig. Royal Artillery,	Fyzabad, ...	1469	133
———	Dett. H. M.'s 77th Regt.,	Near Sasseram, ...	1474	74
No. 1	H. M.'s 19th Regt., ...	Dinapore, ...	1483	87
No. 2	Ditto ditto, ...	Ditto, ...	1507	88

Measurement of each Ward in the Temporary Hospitals.—(Continued.)

Name or Number of Ward.	Regiments.	Stations.	Cubic space for each Patient.	Superficial Space for each Patient.
West Hospital Nos. 3 & 5 ea.	H. M.'s 88th Regt., ...	Delhie,...	1507	81
No. 4	H. M.'s 97th Regt., ...	Banda, ...	1513	126
———	14th Indian Naval Brigade,	Chyebassa, ...	1546	96
No. 3	H. M.'s 19th Regt., ...	Dinapore, ...	1578	93
No. 4	Ditto ditto, ...	Ditto, ...	1578	93
No. 4	H. M.'s 2nd Bn. 60th Rifles,	Secrole, ...	1646	103
West Hospital No. 7	H. M.'s 88th Regiment, ...	Delhie, ...	1689	83
No. 7	H. M.'s 97th Regiment, ...	Banda, ...	1759	92
West Hospital. No. 11	H. M.'s 88th Regiment, ...	Delhie, ...	1806	97
West Hospital. No. 4	Ditto ditto, ...	Ditto, ...	1821	99
West Hospital. No. 9	Ditto ditto, ...	Ditto, ...	1857	103
No. 6	H. M.'s 2nd Bn. 60th Rifles,	Secrole, ...	1870	125
West Hospital No. 6	H. M.'s 88th Regiment, ...	Delhie,...	1938	112
East Hospital No. 5	Ditto ditto, ...	Ditto, ...	2076	120
West Hospital. No. 10	Ditto ditto, ...	Ditto, ...	2099	112
West Hospital. No. 1	Ditto ditto, ...	Ditto, ...	2202	113
———	H. M.'s 53rd Regiment, ...	Barrackpore, ...	2304	209
No. 2	H. M.'s 2nd Bn. 60th Rifles,	Secrole, ...	2304	144
Male Ward	1st Troop 1st Brig. Horse Artillery, ...	Lucknow, ...	2350	94
———	Dett. H. M.'s 48th Regt.,	Orai, ...	2400	133

The admeasurements now adopted by the Public Works Department of Bengal, in their Standard Plan for the Hospital of a Regiment of European Infantry, are as follow.*

Superficial Area, per man, ...	78	feet.
Cubic Space, exclusive of roof space, per man, ...	1,872	„
Ditto, inclusive of roof space, per man, ...	2,262	„

Faulty Arrangement and Construction of Hospital Buildings.—Dr. Fleming's sketch of the old Calcutta General Hospital affords us an insight into the slovenly and injudicious manner in which the sick of our Indian army were accommodated, towards the end of last century. Much, however, as such an hospital as that was must have tended to give the climate of Calcutta its evil reputation, the arrangements of the place were, evidently, far more liberal than those generally made, at that period, for the sick of our army at Home, who, then, for the most part, had no proper hospital accommodation whatever.†

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* I am indebted to the kindness of Captain Dickens, Officiating Secretary to the Government of India in the Public Works Department, for the details of these admeasurements.

†Dr. R. Hamilton, writing in 1787, says—"Every Regiment has an hospital for its sick, provided a house, for that purpose, can be procured in the place where they are quartered. To defray the expense of this, Government allows about thirty pounds sterling per annum in some Regiments. I believe, indeed, this is the allowance in most. If there be any overplus, it is applied to the purchase of Wine for the sick, utensils for the house, such as dishes, spoons, chamber pots, &c. Out of this, six pence a day is paid to a Nurse in some Regiments,—an indispensably necessary servant for an Hospital. To supply medicines, each Private pays a penny a month; each Non-Commissioned Officer a penny three farthings."

In a Regiment, with a war complement of about 746, there were, generally, about 100 on the sick list, but the majority of these were, usually, trivial cases. It, however, appears, not unfrequently, to have happened that Regiments were quartered in towns where hospitals could not be hired. The men were, then, treated at their Billets.

"The Billets in England," says Hamilton, "and I may add in Scotland, are always in public houses, and the landlord never fails to look on the soldiery not only as a nuisance, but as a great drawback on the profits of his business. They are treated coldly, and frequently lodged poorly. The places allotted for them are generally some uninhabited garret or lumber-room, where the very air they breathe is so vitiated as, at first entrance, considerably to affect a person unaccustomed to it. If the landlord has no garret, he has, perhaps, some backhouse, where he erects a few dirty beds. Such places are set apart for the soldiers, because fit for no other use. The clothes on their beds are, frequently, so scanty, and so much worn, as, even in Summer, to be almost unfit to keep them warm; and, should it be

The original structural faults of the present General Hospital, and of its right wing, long appropriated as the Garrison Hospital, may be taken as fairly illustrating the defects of many of our older Hospitals. It is a two storied building, very few of which have, up to the present time, been provided for troops, and was, therefore, erected upon what must have, then, been considered a scale of great liberality.* The wards of the

cold Winter weather, altogether insufficient. This often brings on Catarrhal affections, and lays the foundation of other more violent diseases of an inflammatory kind, not unfrequently ending in death." "What then," he exclaims, "must the Billets be in sickness? Bad beyond description. Perhaps the chief part of the cure consists, in these cases, in pure air. But the poor soldier is mounted up in a close, foul, dark garret. At other times, again, the Billet is pervious to every blast."

He describes the miserable position of a soldier who died of Typhus. "I think it was in the month of March. The season was extremely intemperate, and the Billet among the worst I ever saw. It was perfect mortar around his bed, which stuck to the feet, the same as in the streets, and the room pervious to both wind and rain. In this sort of apartment were several beds occupied by the other soldiers." "After this poor man's death, and some other misfortunes of almost a similar nature, the Commanding Officer determined to have a house for an Hospital, if it was to be purchased for money; and one was, with difficulty, procured. It was not better than the billets; even worse than several of them."

The Hospital house was seldom commodious. "I have," he says, "seen it consist only of two small rooms, one above the other, with the kitchen, which made the ground floor; and, in each of these, no fewer than twelve men, though the room did not measure above twelve feet by fifteen, the place being almost one continued bed, without spaces between, instead of distinct beds. Into this crowded spot the worst cases were sent. Some chronic cases, some acute fevers, punished men with their backs suppurating, and emitting a smell intolerable even to people in health." "Whenever an officer found a man unfit for duty, and took it into his head to send him to hospital, he had to be admitted. The Surgeon could not refuse."—Again, "For a regiment of the complement already mentioned, we should not be provided with fewer than from 20 to 25 beds. Ten of these should be small beds for single patients; viz. for those in acute diseases, or under other complaints, where a bed-fellow cannot be admitted; the rest double, or so large as to allow room for two to sleep together. *From the small and circumscribed bounds of a regimental hospital, it is impossible, if we have many sick, that all can have single beds.*"

We must not shrink from the fact that the English Nation were slow in learning to treat their soldiers with humanity, and were unready in profiting by the teaching of the "ingenious and judicious Pringle," as nearly all his professional contemporaries termed him. A strict comparison of facts will, I believe, show that the East India Company were nearly always in advance, in the adoption of sanitary measures.

* According to Drs. Burke and McLeod, the original buildings were "two old store houses."

wing buildings had, on each side, an enclosed verandah, ten feet wide, but no outer verandahs. (Many of the best houses in the country were, then, constructed in this manner, outer verandahs not having come into general use.) We have, already, noticed that the windows were only venetianed, and have alluded to the lowness and narrowness of the wards, and the evil arrangement of the privies. It was generally necessary to fill the narrow inner verandahs with sick. The sun shone into the wards, covering an extent of several beds in each row; and the only defence against this was to shut the venetians, and, (after they had been furnished,) the glass windows, by which the heat was very partially, and the fresh air totally excluded. Every shower of rain beat in upon the patients. During the rains, the patients had no place to walk in. Dr. McLeod, from whose report the above details are gathered, says that, by occupying the enclosed verandah, the Hospital would accommodate 87 patients,—"but, certainly, not very comfortably." In a return from the Barrack Department of Fort William, he found the building rated as affording accommodation for *three hundred* men: at present, in its improved condition, it is considered capable of containing only *one hundred and fifty* patients.* Dr. McLeod exclaimed against the want of separate wards, for the proper division and classification of

* We have, here, broad traces of a great error which has led to more destruction of health, in our Barracks and Hospitals, than any other which we can name; we allude to the practices which, until of late, were universal, and are, at present, common, of measuring the containing capacity of a building merely by the extent of its area, and, therefore, of placing in it as many beds as it will contain, without apparent crowding, or of unhesitatingly cramming in as many beds as the place will hold, where the wards are lofty, and the ventilation appears to be free. I have now before me a very striking example of the manner in which this error has often wrought, in a return of available accommodation at a station, notorious for its unhealthiness, drawn out by the Barrack-master about a year ago. It will be sufficient to quote the first line of this document. No 1 Permanent Barracks affords "accommodation, calculated from the area of the Barrack," for 400 men; "number which may be accommodated by arrangement of cots" 424; "convenient accommodation, with due regard to the health of the Troops," 300. The officer has here taken a large and judicious view of the capacity of his Barracks; but, when we go further, and find that he gives from 1,019 to 2,423 cubic feet, as "convenient accommodation, with due regard to the health of the men, we can readily understand how these Barracks became unhealthy, when the accommodation was "calculated from the area," or when it was measured out, according to the "number which may be accommodated by arrangement of cots."

patients, according to their diseases, and for convalescents, as a defect that, here, could not be remedied, in consequence of the lowness of the roof not admitting the necessary partitions, without total destruction of ventilation. There were not even means of separating a noisy, delirious, or dying patient, by whom the whole ward was, consequently, liable to be disturbed.

Dr. McLeod shows that, during 13 years,—1822-35,—before this Hospital underwent improvement, the average proportions of deaths to strength and of deaths to treated, per annum, were, respectively, 1 in 13·364, and 1 in 24·158; while, during 3 years, 1836-38, (after the Hospital had been fitted with glass doors and windows,) the rates were 1 death in 33 to strength, and in 39 to treated.

Much that we have already said tends to show that, twenty years ago, a large proportion of the European Hospitals in Madras had been built with little or no judicious consideration for the comfort and recovery of the sick.

In his Reports, accompanying the General Quarterly Returns of sick, of Queen's Troops, in the Madras command, for the year 1838, Deputy Inspector General Dr. Murray remarked* that the Hospitals, in that Presidency, were "far from being so scientifically constructed for the preservation and recovery of health as they ought; and the sites of some of them are badly chosen." In the same year, another writer† stated that the Madras Hospitals had no purdahs (blinds), or glass windows to the verandahs, so that the sun and wind and dust might blaze and sweep in without stoppage or hindrance. That in but few was there an appropriate place for bathing or cold affusion. The bedsteads were generally old fashioned lumbering things full of bugs. In one particular Hospital alluded to, there was not a single tepoy or table or form of any kind; "the patients being under the necessity of taking their meals on their cots, every thing they had being contained in a basket which forms their omnium gatherum, for their bread, knife and fork, meat, (if allowed any,) shoes, brushes, combs, &c; which basket was either suspended over the patient's bed or stowed under it."

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* Madras Quarterly Journal, vol. 1, page 438.

† India Journal of Medical and Physical Science, N. S., vol. 3, page 727.

The Madras Medical Board's Reports, which were published after a rather active spirit of Barrack and Hospital improvement had been, for some time, at work,—when the hospital at Secunderabad had been much improved,* and when the construction of new Barracks for the troops at Bellary had been decided upon,—show that the European Hospitals, in that Presidency, were, for the most part, only a few degrees better than the notoriously bad Barracks. They were, generally, ill arranged, as in oblong squares,† or formed three sides of a square,‡ or were placed at a right angle.§ They were seldom well raised.‖ Scarcely any,

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* The condition of the Regimental Hospital at Secunderabad, (in which so many hundreds of our European Soldiers perished), is fully described in several reports previous to its improvement about the year 1837. Its situation was a rising ground, at a distance of about 250 paces from the Barracks. Its wards were narrow and unventilated, they appear to have been of the same height and width as those of the barracks, which were both low and narrow. It was, however, provided with a good inner verandah on both sides, and with apertures in the roof for ventilation. There were no windows, but the upper thirds of the doors were fitted with venetians or glass, and were made to open separately. These served as substitutes for windows. The accommodation was insufficient; only about 100 patients could be comfortably accommodated, "although" (says Surgeon Shanks) "*the number has, sometimes, been double.*" The whole was enclosed by a high wall, only 10 or 12 paces distant from the building, which obstructed the free circulation of air, and circumscribed the space allowed for the patients to take exercise in. The building was in the very objectionable form of an oblong square. After its improvement, in 1837, its wards were 18 feet high and 18 wide. The enclosed verandahs, intended to receive sick, 14 feet broad and 12 high. There appear to have been no outer verandahs: ventilating apertures were placed in the tops of the walls: the roofs were tiled. A small ophthalmic ward, two detached buildings for maniacal patients, two bath rooms and other appropriate out offices had been provided. The encircling wall was removed to a distance of 100 feet from the buildings, which were then calculated to contain 164 patients, when the 12 feet wide inner verandahs were full.

† Secunderabad and Arnee.

‡ Artillery Hospital at Palamcotta—Cavalry at Bangalore—Garrison at Cannanore.

§ Poonamallee.

‖ Masulipatam 1 foot 8 inches—Regimental Cannanore—and Infantry, Bangalore—and Regimental, Kamptee, 3 feet; Cantonment Hospital, Saint Thomas's Mount, 5½ feet. Presidency General Hospital "about a foot."

except that at Cannanore, had both outer and inner verandahs, even on one side.* The wards were, nearly invariably, very deficient in height† The roofs were, generally, of the kinds worst calculated to exclude heat. A few were terraced;‡ one or two were bomb-proof;§ but most of them were pents, tiled and without ceilings.‖

It can scarcely be matter for surprise that the inmates of such Hospitals as these suffered excessively from Insolation, Dysentery, and Hepatitis.

We shall close this hasty notice of the ill constructed Hospitals of Madras with two brief examples.

We have, already, seen,¶ that, in 1833, a fearful mortality in H. M.'s 62nd Regiment, in the Fort at Masulipatam, led to the almost immediate abandonment of that post, as a station for European Troops. We have shown that many preventable causes tended to produce this lamentable catastrophe; we must add that the Hospital was also much in fault. It was a brick building, raised only one foot eight inches above the ground, divided by cross walls, communicating by arched openings, into 8 rooms, each 42 feet long, (the breadth of the building;) the wards were only thirteen feet five inches high, with terraced roofs. "The rooms in the Hospital were capable of containing twelve patients each, total ninety six."

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* At Masulipatam, there was a 12 foot verandah on one side; at Secunderabad, (latterly,) enclosed verandahs, of the same width, on either side. At Kamptee, a 10 foot front and 12 foot back verandah. At Mergui, the building was surrounded by a 6 foot verandah; at Merkara a 10 foot outer verandah; Presidency General Hospital a 9 foot outer verandah. Garrison at Cannanore surrounded by a 7 foot enclosed verandah, and with a 12 foot open one on one side;—Cavalry, Bangalore, a surrounding verandah only $7\frac{1}{2}$ feet wide. Infantry, at the same place, a narrow unenclosed verandah.

† One of the wards at Cannanore, 13 feet, (the height of the main building was 17 feet;)—Poonamallee, $10\frac{1}{2}$ feet; Presidency General Hospital, $15\frac{1}{2}$ feet; Kamptee Regimental, 15 feet; Detachment Hospital, Merkara, 16 feet; Masulipatam, $13\frac{1}{2}$. We have, already, seen that the wards of the old Secunderabad Hospital were "low." After the main wards were raised to 18 feet, the inner verandahs were only 12 feet high; Mergui, 11 feet; Cavalry at Bangalore. $12\frac{3}{4}$, Infantry 11.

‡ Presidency General Hospital and Masulipatam.

§ Artillery Hospital Secunderabad, Garrison Trinchinopoly [?]

‖ Wallajahbad, Secunderabad, Poonamallee, Arnee, Regimental Cannanore, Garrison Cannanore, (double tiled roofs,) Female Ward Presidency General Hospital, Merkara.

¶ Page 166.

When the unfortunate 66th reached Masulipatam,—after having been nearly decimated by cholera on the march—in April, in an unusually torrid season, just as the hot winds had begun to rage, what was required of this close ill-constructed Hospital, ("partly self enclosed by the officers' quarters,") in which punkahs and thermantidotes were unknown, with its ill arranged accommodation for *ninety six* patients?

"Cholera, (wrote Deputy Inspector General Murray) " again broke out, which, in conjunction with coup de soleil and fever, *in a short time placed the whole of the regiment in Hospital, with the exception of* 60 *or* 70 *men.*" Need we feel surprised, or attribute all the blame to the natural unhealthiness of the place, or to the intemperate heat of that season, when we find that dysentery patients were attacked, in hospital, with cholera; that dysentery, itself, frequently ended in sloughing; (there were 59 deaths from this disease in the regiment during the year;) that the regiment was then attacked with land scurvy; and that 57 cases and 9 deaths occurred from this cause; that "amongst the first 12 cases, seven were under treatment in Hospital for buboes, and had undergone much confinement and purgation," and that one of the most effectual remedies was found to be "removal to a temporary hospital built on the ramparts, where the air was purer than in the established hospital:" and that, by the 6th of September, 194 men, 28 women and 89 childern, had died in the Fort within five months?

We have, already, noticed the evil reputation which the European Station, in the Lower Fort at Bellary, long ago, obtained. Cholera had never been absent from the Barracks for a single year, since its first appearance at the station. We have shown what the old European Barracks were.* What the Hospital, which, originally, belonged to those Barracks, was we do not know; but it was, doubtless, extremely bad, as it was abandoned twelve years before the old Barracks were pulled down. In 1830, Dr. Henderson of H. M.'s 48th Regiment, gave an account of the new Hospital.† He could not avoid expressing regret at finding 3,000 Rupees expended on the erection of an Hospital, without a due regard to real comfort, which, in his opinion, had, in many points, been lost

* *Observations which accompanied the Annual Return of Sick, of H. M. 62nd Regt, for* 1833; *Madras Quarterly Journal* vol. 1 p. 1.

† Page 451.

‡ Madras Quarterly. Vol. 3 p. 123.

sight of on the present occasion. The Hospital was, decidedly, too narrow, being barely 18 feet wide, so that, allowing 6 feet 2 for the length of each cot, and the distance of one foot between the head of the cot and the wall, there was only a vacant space of three feet eight in the centre of the ward. The roof was of tiles, which added much to the heat of the building; and, not being flat, deprived weakly men of the very great comfort of taking a little exercise, morning and evening, on the top of the house. This he represented in sufficient time, but he was sorry to say it met with no attention. The flooring was of the very worst description. It consisted of large irregular stones, laid down, seemingly, without the least attention, and the interstices filled up with sand, which was so thinly coated with lime that the whole of the space in the centre of the ward, and opposite the doors had, already, become so irregular, that it was a service of some danger for a weakly man to walk about, unless he was particularly careful.

In 1839-40, Dr. Allman, of H. M.'s 4th Foot, remarked that, in the construction of this building, many things necessary to the health and comfort of the patients had been overlooked. Improper ventilation, narrow wards, and want of suitable places for the men to wash in, were among the defective points more particularly to be complained of; venetian shutters, so indispensable in this country were, here, much required. In the following year, Dr. Parry, of the same regiment,* noticed that the Hospital was about to undergo very material alterations, the principal of which were—enclosing the verandahs, on both sides, with jalousies and doors, partly glazed and partly venetianed; raising the walls four feet, for the purpose of admitting ventilators along the sides, and converting the roof into either a flat or an arched one which, it was expected, would rid the building of the myriads of bugs with which it was infested, to the great torment and annoyance of the patients.

His report for 1841-42, shows that nothing had, then, been done to improve this bad Hospital. "The wards were extremely narrow, the verandahs open, the principal means of ventilation being through the doors and windows; and these, not being provided with venetians, could not be closed, even for a very short time, without rendering the interior insufferably hot, nor kept open without exposing the patients

* Madras Quarterly for April 1842, p.p. 115, and 125.

to sudden gusts of cold chilly winds, which blow here, with great violence, during a considerable portion of the year; *this had been the frequent cause of serious relapses among them;* moreover, these being always crowded, all attempts to classify the sick were wholly out of the question; so that, for want of separate and proper apartments, the maniacal, the delirious, and the dying were promiscuously mixed with the other patients, which could not but produce a most injurious effect on their minds."*

We find nothing, in our notes, regarding this Hospital until 1856, fourteen years later, when Dr. Eyre writes† in describing the improved Barracks at Bellary.—"It would be gratifying to say that an equal regard for the accommodation of the sick has obtained; but, while the healthy have, for some years, been well provided for in Bellary, the sick have had to occupy a building that has been condemned, as unsuitable, by one regimental surgeon after another."—He adds—"It is in contemplation to build a new Hospital."

What an insight do these comments, scattered over a period of thirty years, give into the incessant destruction of life, in one regiment after another, which a thoroughly ill constructed Hospital may keep at work. After perusing such accounts as these, the uninitiated begin to have an insight into the truth of Pringle's ejaculation,—"*Hospitals are among the chief causes of mortality in armies!*" We have seen that it was not penuriousness which led to the erection of this evil Hospital, which,—in its first cost, and in the outlay demanded for extensive improvements, which never rendered it habitable,—entailed a greater expense to Government than would have been sufficient for the construction of a really good Hospital. Neither was this ill arrangement attributable to the absence of sanitary advisers. The fact that, in 1840, it was determined to demolish the roof,—the faulty plan of which the regimental surgeon had judiciously protested against, before its erection only ten years previously,—is most significant of one of the principal causes which long rendered our Hospitals and Bar-

* Madras Quarterly: October 1843.
† Indian Annals, April 1856, p. 664.

racks, both in the East and West Indies,* at once the costliest and the unhealthiest military buildings in the World.

The principle, now thoroughly understood by all who have reflected upon the subject,—that the builder of an Hospital must not be permitted to sacrifice the health and comfort of the sick to the beauty of his architectural design,—ought not to be overlooked in India. Calcutta contains more than one example of money squandered and sanitary laws disregarded, in ineffectual attempts to convert the temple of Jupiter into the temple of Esculapius,—as if the architect, having unlimited bricks and stucco at his command, and having only studied the construction of Royal Exchanges in the Grecian style, had looked out his showiest design; and, having nearly completed the edifice, had recollected, with disgust, that he was required to fit up its interior as an Hospital. Architects will now learn, in the pages of the "Builder," that, henceforward, when called upon to build Hospitals, their fame will be measured, exclusively, by their success in securing the comfort and recovery of the sick.

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* "*It is*," said Dr. Moseley, as quoted by Sir R. Martin, "*a solecism in economy* to have *a bad hospital*." "I lost" (he continues) "more value in men at Castille Fort and Up-Park in three months, from the miseries of the Hospital alone, than would have been adequate to the expense of erecting a proper one for all the troops in the Island"—Jamaica.

We are told that, during the earlier years included in Tulloch's Reports, many of the Hospitals in the West India commands "were reported to be in a state of great disrepair and dilapidation; but, of late, particularly since 1830, numerous improvements have taken place and complaints, on that head, have become comparatively rare." This can have been no trifling evil, where "among every 1000 white troops (on the Windward and Leeward commands) there have been 1903 admissions into hospital in the course of the year," and where one case in 24 proved fatal.

We cannot gather, from these Reports, much, regarding the Hospital arrangements, which tends to throw light upon the high mortality rates which have prevailed at most of the stations. A large proportion of the European Hospitals are described as being isolated buildings, erected on pillars or arches, often having two floors, and generally provided with balconies, in front or rear, and, sometimes, all round. Here and there, however, these buildings appear to have been very exceptionable. The Hospital at Port Royal—(where, during 20 years, 1817-36, the annual mortality rate was 113·1 per 1000,)—"is *in a narrow street* leading from the town to the Barracks, and consists of a *ground floor* and upper story" divided into six wards, with balconies in front and rear. At Fort Augusta the barrack "consists of a stone building, two stories high, but not arched or raised from the ground, owing to which, it is said, a larger proportion of sick comes from the under story. The hospital is built

Upper Storied Hospitals;—In the Chapter on Barracks, we have, already, dwelt, very fully, upon the absolute necessity of lodging Europeans, serving in the Tropics, in well raised buildings, above the influence of the ground malaria.* The principle is thoroughly understood and accepted by all medical officers; but, as most of our European sick are still lodged on the ground floors of Hospitals, the elevation of which is very insufficient, a few more illustrations of the certain ill consequences of this practice will not be out of place.

We are told that, in the Hospital at Padua, washed by the Brenta, a sluggish river, the patients in the under story, (if their windows were carelessly left open,) were attacked frequently with intermittent fever; but that this never occurred in the womens' ward, situated immediately over head.†

At the barracks, at Basse Terre, Gaudaloupe, where the yellow fever raged in 1816, it was shown by Assistant Surgeon Ralph, of the 2nd Regiment, that, "in the month of August, one case of fever presented itself in every *twentieth* man of those quartered on the ground floor, and in each *thirtieth* man, of those on the *upper floor*. During that part of the month of September which has elapsed, each *twenty fourth* man was attacked with fever, of those stationed in the upper rooms, and each *fourteenth*, among those in the lower.‡

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in the lowest part of the Fort, and is liable to the same defect of not being raised from the ground." Here, the mortality rate was 73·5 per 1000. At Spanish Town, the Barracks and Hospital were surrounded by a high wall, "which serves to confine the men to Barracks; but, of course, has the disadvantage, *in a crowded town*, of materially impeding ventilation." The death rate was 162·4 per 1000, annually. Dr. W. Fergusson, in speaking of the causes of Yellow Fever in the towns of the West Indies, remarks that they—"so far from being corrected by an enlightened police of towns, are often forced into unnatural activity by the utter disregard of those regulations of cleanliness, and order, that all well governed communities take pride in observing." We have, already, alluded to the frightful unhealthiness of Fort Charlotte, Bahamas. (page 407. "The hospital appears to have been more unhealthy" (than the barracks) "in its site; so much so that *the white soldier in sickly seasons, looked upon admission into it to be equivalent to a death warrant.*" "The death rate was 200 per thousand, or a fifth part of the whole force, annually."

* Page 406.

† Clark on Climate.

‡ *An Inquiry into the Origin and Nature of the Yellow Fever, as it has lately appeared in the West Indies. By William Fergusson* M. D., Med. Chir. Trans. Vol. VIII, page 170. The 2nd Regiment were newly arrived; the well seasoned 25th and 60th Regiments occupied the same barracks, but the 2nd alone experienced any difference of health between those that occupied the ground floor and the upper story.

Sir G. Ballingall mentions* that a very remarkable exemption from disease, in the upper floor of a barrack while it raged below, fell within his own observation, in the 69th Regiment, at that time quartered in the fortress of Seringapatam, and occupying a building which had, formerly, been one of Tippo's palaces. He recollected, also, that, in the large Hospital at Sourabaya, in the Island of Java, one of the best Hospitals he had ever seen, they used to remark the more rapid convalescence of patients upon the upper floor. Indeed, the lower story of this building was, very judiciously, appropriated to the necessary offices of the establishment, and but a small portion of it was occupied by the sick.

In his account of the epidemic remittent fever which prevailed, after the rains of 1833, in Calcutta and its suburbs, the late Dr. Corbyn mentions that,—when the wise precaution of keeping the ditch of Fort William full during the rains, which had been adopted at his suggestion, was intermitted,—the result was that most of the inhabitants of the lower-roomed quarters of the gateways were affected with severe fevers.†

Formerly, one of H. M.'s Regiments and one or two Native corps, were stationed at Wallajahbad. The amount of disease was, generally, very great, and the vast mortality which occurred obtained for the post the name of "*the Grave of Europeans.*" Between the 1st January 1807, and the 31st October 1808, in H. M.'s 30th Regiment and 2nd Battalion of the Royals, the total number of sick amounted to 3222, out of an average strength ranging from 927 to 987. Of these admissions, 1662 were for Dysentery, 577 for Fevers, and 348 for Ulcers. The deaths, from these causes, were respectively, 149, 26, and 16. During the one year and ten months, the percentage of deaths to strength, was 113·37 per thousand,—a very high rate, considering that there was not a single case of Cholera. Writing in 1843, the Madras Medical Board mention that nothing could, then, be observed in the site of the cantonment, (which had been abandoned as a station for European troops, and was occupied as the Head Quarters of a Native Veteran Battalion and Drum Boy Establishment,) or surrounding country, which would account for the great sickness which had prevailed there. They, however, noticed that "The site of the barracks is low; they are

* Op. cit page 78.

† India Journal of Medical Science vol. 1, Jaunary 1834, page 1.

built in the form of a square, closed on all sides, with a gateway to the North." The walls are of brick and mud, having pent and tiled roofs, with a verandah on the inner side, reaching to within six or seven feet of the ground. *The floors are not raised, and, in some parts of the building, they are even below the surrounding level.* The only means of ventilation is by doors and windows, both of which are unprovided with venetians."

"The cold wet floors, during the monsoon, and imperfect ventilation were, alone, considered amply sufficient to produce Dysenteric Affections and low Typhoid Fevers,—the diseases which principally occasioned the great mortality, amongst the European troops, at the time above-mentioned.* This opinion is confirmed by that of medical officers of great experience. The following is an extract from a report by a late Superintending Surgeon on these barracks; *viz.*—'The only cause (of the sickness) that can be imagined, is the great defect in the public buildings: the floors are too low, even lower than the surface of the surrounding ground; and those of the officers' quarters are considerably below the surface and, actually, require a cut or drain all round, to prevent water running into the apartments'. The reports of the medical officers, during the last 15 years, are, invariably, favorable."

The erection of Upper Storied Hospitals has long been advocated by Medical Officers in India, and more than one excellent plan has been recommended. In 1826, a Committee, consisting of the Inspector General of H. M.'s Hospitals, the Garrison Engineer Fort William, the 3rd Member of the

* It is, however, worthy of mention that Sir G. Ballingall quotes, (at page 509), a communication to the Medical Board of Madras, by Sir Simon Heward, relative to this outbreak of Dysentery in the 30th Regiment, in 1807, in which it is stated that,—"the confinement of the men to their quarters" (they were a newly arrived regiment,) "was from the hour of 8 A. M. till 4 P. M., and is still continued. This was attended with such beneficial effects that, in about a fortnight after, the admissions not only become fewer in number, but, what was also observable, the disease, from being highly aggravated in its symptoms, became gradually less so, and, from that period, took on, daily, more and more the character of common Diarrhœa." And thus the observation has long stood:—but it happens, unfortunately for the validity of the worthy Surgeon's argument, that Dysentery did not cease in the 30th Regiment, and 2nd Battalion of the Royals, in that year. The Board's Table shows that,—while 189 cases, with 74 deaths, occurred in this Hospital, in 1807,—they had no less than 973 admissions, and 75 deaths, in the first ten months of 1808.

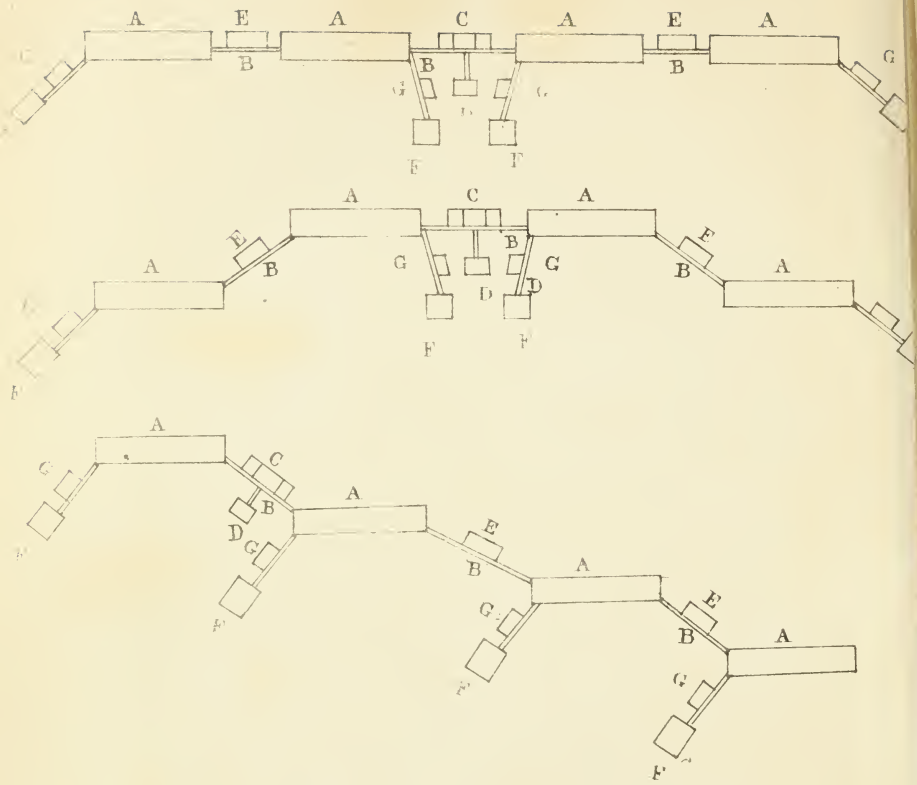
Medical Board, the Superintendent of Public Works, and the Surgeon to the General Hospital,—who had been convened, for the purpose of reporting upon the condition of the Calcutta General Hospital,—recommended the erection of two new hospitals, of two stories; each hospital to be capable of containing 100 patients. The two apartments, composing the upper and under story, to be, internally, in width 24 feet, in length 240 feet, or what may be necessary, (according to the newest and most approved plans,) for the number of patients as above proposed, and in height 20 feet: that there be, to each, an inner verandah, all round, of 14 feet wide; and an outer verandah, on columns, all round, also of 14 feet wide; with fixed venetians and a railing to prevent the patients falling over. The inner verandah should have glazed, as well as venetian, doors. The hospitals to be 7 feet from the ground, and the basement flued throughout. The necessaries and, if practicable, the water-closets, *to be built at some distance from the hospitals*, to which they are to be connected by covered passages. There must be also all requisite offices, such as Pharmacies &c., and rooms for the hospital attendants and servants; Receiving Rooms, destined for the reception of patients, in which they are examined, classed, and equipped for their several wards; bathing rooms, for cold and warm baths, and all the appendages necessary or useful for conducting the important process of bathing, in all its variety of forms; an apartment, having a sky-light, to serve, occasionally, for an operation room; also store-rooms for the Steward's department; dead house, washing-house &c. The committee urged that, in the construction of this hospital, it was a chief preliminary consideration that "the space, to be allotted to the sick, should be so ample that there would exist means of evacuating, purifying, and occupying the wards in succession; for, in places constantly occupied by the sick, it has been experienced, in numbers of instances, that the air becomes impure, notwithstanding every precaution; a cause, when produced, which serves to propagate disease and to resist the perfect recovery of health in all."

Upon this recommendation, the fine building, already spoken of, which has since been occupied as a Court House, was erected, having been completed about the year 1828. Dr. McLoed describes it as having been built in such a manner as to avoid all the structural errors of the old Hospital. "Instead of narrow wards and low roofs, and no verandahs, we have, here, large and roomy wards, 34 feet wide, and 20

and 21 feet high, with an inner inclosed and outer open verandah, on both sides." "There are separate rooms for such patients as require to be kept alone, and an ample space for any sudden influx of cases, for which all hospitals should be provided, on the appearance of epidemic diseases, by which crowding of the wards may be avoided, at the very time when room is most wanted. By the neglect of such arrangements, hundreds of lives have been sacrificed in this country, and many diseases have been rendered malignant and intractable which, under different circumstances, would have readily yielded to the common remedies. There are also bath rooms on each floor, and permanent shower baths, with pipes for hot and cold water, &c. &c. In short, the building is constructed on the most modern and approved plan for Military Hospitals, and a plan of it should be sent to each Presidency, for the future guidance of those who may be entrusted with the erection of buildings."

A plan for a two storied Hospital has, recently, been proposed by Deputy Inspector General Dr. John Murray, in consultation with Colonel Cunningham, Chief Engineer N. W. Provinces. This would be, in many respects, an excellent building. It is double, and is capable of affording accommadotion for 144 patients, with 1600 cubic feet of air to each, on the upper floors, and 60 patients, with the same allowance of space, on the lower floors. The dimensions of its inner and outer verandahs are not quite so liberal as those of the building described above. Still, it is remarkably well proportioned, and could be constructed at an expense not exceeding that of an Hospital upon the old single-storied plan.

The general objections to upper storied buildings for troops, in India, have been stated in the Chapter on Barracks. As regards Hospitals, I do not consider that these drawbacks are of very great importance. Danger cannot arise from the accumulation of from 150 to 200 sick, especially where the building can be arranged in the form of from two to four double storied pavilions, connected by covered passages. The plans of double storied Hospitals, which I have seen, are objectionable in not providing sufficiently for the classification of the sick. A double storied block, intended to contain only from 150 to 200 patients, cannot be subdivided without introducing partitions, which vitiate the whole plan, by interfering with thorough ventilation. Four double storied pavilions, each completely



A Wards.

B Arcaded passages

C Admission Room Dispensary & Apothecarys Quarter. On the upper sto-
Operating & Committee Rooms.

D Rooms for Warm Shower & Douche Baths.

E Rooms for Medical Subordinates on duty Hospital Sergeant, Orderlies,
Nurses contiguous to the Arcaded Passages.

F Latrines.

G Lavatories.

surrounded by its inner and outer verandahs, would afford eight entirely separate wards, (which are amply sufficient, for classification,) each of which would have thorough perflation from side to side, and from end to end. In building such an Hospital, the chief difficulty lies in the arrangement of the Latrines and Lavatories. These cannot, with due regard to the health and comfort of the inmates, form part of the main buildings, or even of the outer verandahs; they must be in separate towers, communicating with the outer verandahs by arched passages. All excreta must be carried away by sweepers.

I have subjoined a rough ground plan of an Hospital, of this description, arranged in three different forms. The third, in echellon, although the least sightly, is, upon the whole, the best arrangement,—as preventing, as much as possible, radiation of heat between the buildings, and as leaving each block thoroughly open upon every side.*

In referring to the Plan, it will be understood that the Latrines and Lavatories are placed on the leeward aspect of the range of buildings.

Standard Plans of European Hospitals.—I am acquainted with three Standard Plans of Hospitals, adopted by the Bengal Public Works Department.—They are

Standard Plan of Hospital, for a Troop of European Horse Artillery: 1853.

Standard General Plan of a Hospital, for a Regiment of European Infantry, November 1857.

Plan of Hospital, for Women and Children of a Regiment of European Infantry, 1859.

* It has, recently, been suggested to me, by my esteemed Brother Officer Dr. Farquhar, whether we are not incurring risk in separating our Military buildings, as much as possible, in this Country, in lines of open echellon. Shortly before the mutiny, Dr. Farquhar visited a district, near Allyghur, which had become impested by a malarious fever of the deadliest type, consequent upon a local inundation. The villages, nearest to the inundation, were absolutely depopulated; the bones of the inhabitants lay about; the tanks were filled with dead; the huts were roofless. In villages somewhat further off, the outer huts were tenantless and roofless; the people in the central huts had mostly survived, and the buildings remained in good repair. We have, already, discussed (at page 392) the power which buildings have in fending off malaria. The above observation, by an officer of experience, who has paid great attention to the laws which govern the spread of malaria in this climate, is one of the most striking that we have met with. Still, with the numerous instances which we before have us, of European troops decimated, year by year, in ill perflated quadrangular barracks, at Secunderabad, at Bellary, at Dinapore, &c. we cannot recognise concentration of buildings as a safe or advisable mode of protecting their inmates against the influx of Malaria.

The Horse Artillery Hospital is an oblong building measuring 142 × 81 feet. Exteriorly, it has a 10 foot open verandah completely surrounding it. Within this, is an inner verandah, 12 feet deep, broken up, at either end, into separate rooms The building is unequally divided into two, by a transverse partition which leaves, down the centre, a male ward measuring 60 × 24, and a female ward, 24 × 24 feet, the former being intended for 20, the latter for 8 patients. The height of the plinth is only 2 feet, that of the outer verandah 12, of the inner 18, and of the centre wards 26 feet. The entire structure is spanned by a tiled pent roof. Here, perflation, from end to end, is entirely precluded by the cross partition; and the, in every way, objectionable old arrangement of placing the male and female patients under the same roof, and on the same flat, obtains. There is no Lavatory and there are no covered passages to the Privies.

The more modern Plan of an Infantry Hospital gives a small central block of building, divided into a Dispensary, Apothecary's Room, Bath Room, Admission Room, and Dressing Room. These are surrounded by a 10 foot outer verandah which is prolonged, at an oblique angle, forward, from the front corners of the building, on either side, forming a colonnade, communicating with the outer verandah of a wing to the right and left. The length of each wing is 324 feet, its breadth 80. Each wing is completely surrounded by a ten foot open outer verandah; within, is a 12 foot closed inner verandah, broken up, at the end of either wing, into 3 rooms. The central portion of each wing is divided, by four transverse partitions, into five wards, each measuring 52 × 24 feet, and intended to contain 16 cots. The main wards, therefore, contain 160 patients. The height of the plinth is six feet, that of the outer verandah 15, that of the inner verandah 17, and that of the central wards 20 feet. The verandahs have flat roofs, and the central wards pent roofs. At the further end of either wing is a Bath Room, opening from the outer verandah, and a privy, also communicating with the outer verandah, but by a covered passage. The Medical Subordinates' quarters are in rear of the central building. Each wing has a cook room in its rear. The whole occupies a square of 1050 feet, surrounded by a wall.

The Hospital for the Women and Children is 142 feet long, and 76 broad. It is surrounded by a 10 foot outer open verandah. The inner verandah is 11 feet deep; its four cor-

ners being partitioned off into four single wards, each measuring 17-6 × 11 feet. In the centre are two main wards, each measuring 43 × 22 feet. The height of the plinth is 4 feet; outer verandah, 12; inner verandah, 15; middle ward 22. The middle wards have swing windows high up in the walls. The Lavatory and Latrine are arranged as in the Regimental Barrack Standard Plan of 1858.

The Regimental and Womens' Hospitals, upon the Standard Plans, are, unquestionably, good buildings, but are to be objected to, in not having sufficient elevation. The height of the plinth should be, at least, seven feet, and it should be thoroughly flued; or, what is better, the buildings should be raised on pillars or arches, to allow of free perflation beneath. The depth of the outer verandah should not be less than 12 feet, or that of the inner 14 feet.

To be thoroughly suited to the wants of the sick, including the Women and Children, a Regimental Hospital, in this country, should, in my opinion, be a one storied building, raised on arches or iron pillars, 14 feet high.* It should consist of eight separate pavilions,—their outer verandahs communicating by collonades. It should be built upon an extension of the echellon plan which I have already given. Each pavilion should contain a single ward, completely surrounded with inner closed, and outer open verandahs, of the above widths. The inner verandahs ought not to be broken up into end rooms, which interfere with thorough perflation. The Hospital Sergeant's, Orderlies', Nurses', Apothecary's, Steward's, Assistant Apothecary's and Hospital Apprentices' quarters should open upon the collonade passages between the wards. Each of the eight central wards should afford accommodation for 25 patients with an allowance of 1800 cubic feet,—exclusive of the inner verandahs *in which beds should never be placed.*

Each ward being entirely separate and complete in itself, such an hospital would afford proper accommodation for the sick Women and Children of the regiment; and, being of ample size, would, generally, admit of, at least, one ward being vacant, for wall scraping or lime washing and repairs, without at all interfering with the comfort of the remainder of the building.

* The arcaded spaces below the wards should be kept daily swept, and ought to be frequently whitewashed. They should be kept entirely vacant, except that, in one most conveniently situated, according to the arrangement of the building, a well constructed Store Room, for the Steward's Stores, should be fitted up.

Due care being taken, the generation of an hospital atmosphere would always be avoidable. Where separate buildings are provided, as they always ought to be, for Contagious Cases, and for Insane Patients, and those suffering from Delirium Tremens, six wards suffice abundantly for ordinary *Classification of the Sick*: the Barrack master should, however, always be provided with one or two wooden partitions, in parts, ready to be put up in a few hours, upon the surgeon's requisition, whenever it may be necessary to close off portions of wards for the segregation of particular cases. Transverse partitions are, certainly, objectionable; but their temporary use, in this manner, may sometimes be convenient and almost unvoidable.

It is evident that the conservancy of an hospital, on this plan, would be far more manageable than that of a double storied building. Such an edifice would have the objections (which, however, are not prohibitory,) of not being so easily served as an ordinary hospital, and of occupying rather more space.

Basement. No Indian Hospital ought to be erected upon a solid plinth; either the plinth should be thoroughly flued, or the building should be supported on pillars. One of the most noticeable defects in a very large proportion of our older Hospitals, and one especially insisted upon in the Reports of the Inspectors General, is their want of proper basement elevation.

Floors. The floors of many hospitals, in the Bengal Presidency, are of tiles or stone flags; but it is mentioned, in the Public Works Code,* that "for hospitals, a good terraced flooring is considered by medical officers preferable to flag stones." It is well known that, unless proper care be taken, the wooden floors of our Hospitals, at Home, imbibe impurities.†

* Chap. viii., Sec. 2, p. 83.

† Miss Nightingale remarks, "The boards are, in time, saturated with organic matter, and only require moisture to give off noxious effluvia. When the floors are being washed, the smell of something quite other than soap and water is perfectly perceptible, and there cannot be a doubt that washing floors is one cause of erysipelas, in some Hospitals. In Scutari, where the wards were overcrowded, the cases offensive, and the floors ill-laid, rotten, and dirty, the accumulated saturations of weeks and months were such, that the floors could not be scoured, without poisoning the patients." In commenting upon the defects of the London Hospitals in his time, Howard remarks, that "*Injurious* prejudices against washing floors were suffered to operate." He always grew angry when he found the floors sanded, and maintained, that "The dry rubbing of the floors, which is too generally practised in hospitals, is almost as bad as hiding the dirt with sand."

The same is the case with the materials used in this country; especially terrace work, which, when not duly renewed, from time to time, becomes excessively offensive, in old hospitals, and which is always dusty. Where wooden floors cannot be provided, plain or encaustic tiles or flag stones are, in my opinion, preferable to terrace work. The floors should be relaid annually.

It is much the practice, in India, to cover the floors of certain buildings with an artificial surface. In Native Jails, the floors of the barracks, and even the wall, are daily *leeped*,—*i. e.* thickly smeared with a compound of clay, cow dung ("gobur") and water. This is considered "the most effectual preventive both of insects and vermin," and it is held that, with whitewashing, it "neutralises the risk of infectious diseases appearing, where any large body of men occupy the same building throughout the year."* In the Bombay Presidency a strong opinion exists in favor of the practice of leeping the floors of private dwellings. I find that this was done in the Kutcha European Barracks at Sukkur, in which such extreme sickness occurred in 1844. I cannot clearly ascertain whether this practice is followed in any of the European Barracks and Hospitals of that Presidency, but a medical friend informs me, that "he thinks he has seen a leeped floor in an European Hospital, at Deesa in Northern Guzerat." These floors, being generally of mud and earthwork, would never be dry in Lower Bengal, still it must be evident that could a composition, which would dry rapidly and not

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It is probable that, if Hospital floors were always constructed of well seasoned wood, and made in such a manner as to admit of being planed occasionally, and with the grain of the wood filled up with bees' wax and turpentine, or varnish, as Miss Nightingale recommends, they might be washed, from time to time, without danger. On this point, Robert Jackson remarks. "If barrack apartments be infected with contagions, nitrous fumigations and white-washing are the means employed to purify them; they are not sufficient if the cause be strongly fixed. A coating of hot varnish would, it is presumed, be effectual for this purpose; but it is expensive, and has, perhaps, never been tried. In prevention of the adhesion of contagions, washing the walls and floors with soap and hot water, or water and potash (provided the walls be polished,) twice a week in warm and dry weather; or dry rubbing, daily, with hard and heavy brushes in cold, damp, and foggy weather, may be considered as sufficient security on this head. Where the construction of the house and its equipments are of a proper kind, washing or rubbing removes the noxious matter, which adheres to the walls or floors."

* The Punjaub Jail Manual.

become pulverulent, be thickly laid over the tiles, flags, or terrace work of our Hospital Floors it would have the very great advantage of been entirely removable, with all its impurities, and renewable in a few hours.

The practice of frequently whitewashing the floors of European Hospitals is, at present, very much in use. Medical men are much divided in opinion, with regard to its utility. It, certainly, gives the wards a very cleanly appearance. It is, however, a means of absorbing and retaining filth which ought to be washed away, and it creates dust; which the suggestion of mixing the lime with rice water, would not entirely prevent. To be thoroughly clean, the floors of hospitals should be frequently washed, and they should be constructed in such a manner as to admit of this.

Inner Verandahs. Some have objected to this arrangement of space, in Indian Hospitals. In Bengal, where none of the best constructed modern houses have inner verandahs, they might, certainly, be dispensed with; greater width being given to the central ward, and greater depth, say 14 to 18 feet, to the outer verandahs; but, Up-Country, they, undoubtedly, tend to keep the buildings cool. In an Hospital, of due width, not furnished with inner verandahs, the surgeon would be tempted to place four rows of beds,—certainly a very objectionable arrangement. The chief objection to inner verandahs is, that they are seldom wide enough to contain sick with comfort, and yet it is continually occurring that sick are crowded into them in seasons of epidemic visitation, when overcrowding, in Hospital, is most dangerous, and when the surplus cases would fare better in tents. They, thus, become a snare and a cause of disease. The old practice, of closing off portions of the sides of the inner verandahs of Hospitals, and the present one, of dividing the ends into separate rooms, cannot be too strongly deprecated.* In most of our older Hospitals, especially in those of two stories, the inner verandahs are separated from the central wards by enormous masonry arches, which occupy a great

* A Hospital, having these end and corner rooms, cannot be thoroughly perflated; and the existence of these apartments leads to all sorts of bad arrangements. Thus, it was recently reported that the Hospital for the troops of H. M. British Army, at Meean Meer, although a very good one, was over crowded. There was a great want of proper accommodation for steward's stores, and of subordinates' quarters; consequently, the Hospital Apprentices lived, some in the Hospital guard room, *some in the Hospital corner rooms, when these were not filled with stores,* some doubled up with the Hospital Sergeants.

deal of space, absorb and radiate heat, and impede the free circulation of air. Iron columns and partitions of corrugated Iron or perforated zinc should be used, as substitutes for these, in all new Hospitals. One of the inner verandahs, at either end of the ward, should be occupied by the dining tables; the other as a library and reading room for the patients. The inner verandahs, at the sides, should be kept entirely vacant, being only furnished with a few easy chairs and tepoys, for those patients who cannot move far from their beds.

Some of the newer Hospitals, near Calcutta, have one of their *Outer Verandahs* boarded, thus affording the patients an excellent place for exercise in bad weather.

Walls. We have, already, recommended the introduction of double walls in barracks. It is mentioned, in the article on Hospitals, in the Medico Chirurgical Review, which we have so frequently cited, that,—in the new Garrison Hospital, in course of erection at Malta, from designs by the Sanitary Commission on Hospitals and Barracks,—the walls, most exposed to the sun, are double, to subdue the effect of the sun's rays in the interior of the wards. We are told, in the "Builder," that "the ward walls," of Hospitals, "should consist of pure white polished Parian cement, or some other equally white non-absorbent substance. Grey coloured cements should be avoided: they never look clean; they give the ward a sombre appearance, and they hide dirt."* The beautifully polished marble cement, of shell lime, which is much used in churches &c. in Madras, and also in many rich Natives' houses in Calcutta, is admirably adapted for the walls of Hospitals; it is, however, I believe, at present, very expensive.

The swing windows, high in the wall, should be one to every two beds. They should be double, to exclude heat, the inner glasses being of neutral tint.

In the chapter on Barracks, we insisted upon the necessity of freely admitting the daylight into Military Buildings. We cannot refrain from giving one additional fact, (as cited in an able review on Miss Nightingale's Notes on Nursing, in No. 1 of the *Madras Quarterly Journal of Medical Science.*)—In his description of his arctic expedition, in search of Sir J. Franklin, Dr. Kane mentions that, in the long arctic nights of constant darkness, all the ship's crew became

* For rules for periodical Whitewashing, Repairs &c, vide page, 481.

affected with symptoms of Scurvy; and that these symptoms disappeared, as if by magic, on the return of sun-light, notwithstanding that no change had occurred in the food, or mode of dieting the men. This is a fact well deserving to be borne in mind in India, where Scurvy is ever to be dreaded. It may be merely a coincidence, but it is certainly true that, when the use of glass windows became general, in the northern countries of Europe, Land Scurvy ceased to be epidemic there.

The remarks upon the *Ventilation* and *Cooling* of Barracks apply equally to Hospitals. We trust that the use of thermantidotes, worked by steam or water power, will soon be generally introduced, in the place of the present thoroughly ineffective and most costly punkah and tatty system.

Roofs should always be double. Where so many self evident causes have wrought together, in producing sickness among our European troops, it is difficult to say which may have been most operative; but I am convinced that few have been more so than the bad and flimsy construction of the tiled pents and flat syrian roofs of their Barracks and Hospitals, in which they can scarcely have suffered less than the state criminals did under the torrid leads of the prisons in Venice.*

* In an article on *the Sickness of Europeans at Dinapore,* published in Finch's India Journal of Medical and Physical Science 1845, page 505, Dr. Kenneth Mackinnon attributed the extreme unhealthiness of our troops at that station, in a large measure, to the poor construction of the military buildings, which he describes as consisting of—"thin exposed brick walls," (verandahs had not then been added,) "the roofs, being flat and of brick, got heated and increased the heat of the air within. The side walls, too, were unprotected; and, besides their getting heated by direct exposure, the want of proper verandahs, by admitting the light, greatly raised the temperature." "Many cases of apoplexy, almost always fatal, were the consequence of the intense heat of the barracks," "where the thermometer rose to 105." He recommended that a second roof should be placed over the Barracks. In commenting upon this paper, the Reviewer states that, during his residence at Dinapore, he had known men, women, and children taken from these barracks, suffering from the effects of intense heat, during the months of April and May, and many not survive beyond a few hours after their removal. If he could trust his memory, as many as four or five deaths, among the unfortunate tenants of the Barracks, had occurred in one day. "The roofs," he added, "are flat, low, and of brick. They soon become heated and become rapid conductors of caloric, cause and keep up a high temperature within the barracks. It is not only while the sun is above the horizon, but after it is set, they continue, until a late hour of the night, to give out the great heat they had absorbed during the day; nor do they get cooled by the rising of the next day's sun: in fact, after the commencement of the hot season, they become so thoroughly heated that they do not cool till the heavy showers which usher in the rainy months."

Many of our syrian-roofed Hospitals might be secured against the vertical rays of the sun, by having placed over them a second roof of mud,—the best material, for coolness, available.

The roofs of the inner verandahs of every Hospital should be flat, to enable the patients to take air and exercise in the evening.

Adjoining the Reception Room of every Regimental Hospital there should be a *Bath Room* completely furnished with the means of giving warm, shower, douche,* and medicated and vapour baths. At present, most of our Hospitals are very deficient in this respect. Every Hospital is provided with bathing tubs and slipper baths to the extent allowed by the Deputy Inspector General of Hospitals.† These, when required, are filled with water heated in large metallic vessels, (degs). It was, many years since, and is now again proposed to furnish every hospital with a fixed boiler, placed conveniently, for the purposes of baths, fomentations &c. &c.

Lavatories, in Hospitals, need not differ much from those in Barracks, except that a moderate supply of hot water should always be available. Some of our hospitals are still very ill furnished in this respect. It was not until last year that the Presidency General and Garrison Hospital were provided with Lavatories. In some Hospitals, as those at Peshawar, a portion of each outer verandah is still partitioned off for this purpose.

Latrines, upon the plan for Barracks, suffice for Hospitals. There connot be a question that the employment of close-stools with English earthenware pans, would be the best and cleanliest system; but the cost of these pans and their brittleness almost preclude their extensive employment Up-Country. It would be well if a porcelain manufactory could be established in some central position. The wards are furnished with the urinaries already described and, by regulation, with copper pans in sets. These latter ought to be tinned periodically; but, generally, native tinmen refuse to undertake this degrading work. The pans are, generally, fitted in light painted

* In his annual Report of the Left Wing 1st Bombay Fusiliers (Bombay Medical and Physiological Transactions No. IV N. S.) Asst. Surgeon Straker judiciously suggests that, at all stations, where coup-de-soleil is not uncommon every hot weather, Hospitals should be provided with some means of giving the douche without a moment's loss of time. We think that every Barrack should also be similarly provided.

† Public Works Code, chapter XX. sec. IV. para 2, page 234.

wooden frames, which are cleanly and easily removed; but not convenient for weakly patients; for whom, however, armed high backed seats are provided in many Hospitals.*

Each European Regimental Hospital has a fixed establishment of Sweepers; consisting, for an Infantry corps, of 1 Sirdar and 8 Ordinary; and, for a Dragoon corps, of 1 Sirdar and 6 Ordinary.† Each Female Hospital has a Mhetranee. For every 15 patients, in excess of 100 patients in infantry, or 60 in cavalry, or artillery hospitals, an extra Sweeper is allowed. Formerly, nearly every Hospital was supplied, from the Department of Public Works, with a Conservancy Cart drawn by Bullocks, and a Driver. Now, under the provisions of Chapter XX. Section 6, Para. 3—viii. of the Public Works Code, Hos-

* The following Statement, exhibiting the dimensions of the Hospital and Hospital Privy, for a Regiment of European Infantry, "according to the improved plans adopted in the Cantonments recently constructed" is given in the Bengal Military Regulations of 1812. *Hospital*, one Building measuring 250 feet in length, 24 in breadth, 15 in height to the wall plate—(90,000 cubic feet)—surrounded by a 10 foot verandah, supported by pillars 10 feet high to the wall plate—(ten ranges of Barracks of these precise admeasurements were appropriated for the accommodation of the regiment.) The floor was raised 1½ foot from the ground, the elevation of the Barracks being only 1 foot.

Provision was to be made, in all buildings for European Troops below Behar, for the terrace or floor being raised on flues. The roof was thatched. The North verandah was enclosed for medicines; and the two corner rooms in the South verandah, each 13 feet each way; one for a corpse, the other for a bath, which was requisitely furnished. A drain, 1½ feet in diameter, all round the Hospital, with two reservoirs at the lower end. Eighteen plain doors 8 feet by 4, and nine, 6 feet by 3 (five in the North verandah and two in each of the corner rooms of the South verandah) 32 plain windows [shutters ?] 6 feet by 4; the soles of the frames of the windows to be 1 foot from the floor; the doors and windows to be painted and furnished with hinges and sliding bars for fastening them. Here, and also in the Barracks, ventilators in the walls 1½ feet deep by 6 inches wide. 10 feet from the ground and 6 feet asunder. Jhamps, of the requisite dimensions, to each interval in the verandah. Floor of tiles, 12 inches square and 3 inches thick, laid in sand and cemented with the best mortar.

Privy measuring 40 by 15 feet, by 10 in height; flat pucka roof. Floor fitted with the requisite conveniences and laid with tiles. It had a covered passage leading to it from the Hospital, 68 feet in length, 6 wide and 7 high.

Thus, a regiment was, then, provided with only one Company Barrack for the reception of its sick,—the rule now is three half Company Barracks. When the number of their sick rose to 150, which must frequently have been the case, each patient could only have had 600 cubic and 30 superficial feet of space—in a building which, when shut up in bad weather, was completely closed except by the ventilating openings in the walls.

† Bengal Medical Regulations, Chap. XV.

pitals are allowed a Bheestie, and two or three sweepers, for the same purpose; the sweepers removing the filth in barrels. Many Medical officers complain of the inconvenience and insufficiency of this arrangement, and prefer the use of the Conservancy Carts.

The Hospital Latrines should be well ventilated and well lighted at night. The one not very bright light, now allowed,* is scarcely sufficient. The walls and corners of the latrines, as well as the door way, should be fitted with charcoal boxes and screens covered with wire nets, which should also be largely distributed in the wards.† The ventilation of these places should be perfect, and each should be traversed by a double punkah.

With regard to *Water Supply and Drainage*, I have nothing to add to the suggestions offered in the Chapter on Barracks.

The Cook Rooms of Hospitals require a thorough reform. They should be small, but light, cool, thoroughly ventilated buildings, with a broad outer verandah all round, double roofs, and proper ranges and chimnies. In fact, they should be, what they are not at present, places where the Medical Officers could frequently overlook the work without discomfort, and where an European Hospital Orderly might constantly remain during cooking hours. Each Cook Room should, therefore, be fitted with a double punkah. A small American stove has long been in use at the Lower Orphan School, Calcutta, and has been very favorably reported upon by Staff Surgeon Hardie. A larger stove, of the same description, is in experimental use at the Presidency General Hospital, with a view to the general introduction of these appar-

* P. W. Code, Chap. XX. Sec. 7, page 248.

† Formerly, Fumigations were much in use in European Hospitals and Barracks, as they still are in some Native Jail Hospitals. The Bengal Hospital Regulations, of 1786, require that "every ward shall be fumigated with benjamin, and sprinkled with vinegar twice a week, from April to November inclusive, and once a week, the rest of the year."

By a G. O. of 1808 "the duty of Regimental Surgeons, in respect to the Hospitals, was to be confined to that of keeping them as clean and healthy as possible within; and, with that view, they were to be at the expense of Behisties and Sweepers, and fumigating their respective wards, whenever it might be judged necessary by the Superintending Surgeons." Previously, by an order of 1787, "Indents for fumigating Barracks are prohibited; fumigation being unnecessary, except upon occasions, which very rarely occur. The Military Boards, having taken the opinion of the Medical Board on the necessity of Fumigations in Barracks, direct the following practice to be adopted, during the rainy months only, in the Barracks of Dinapore, Berhampore, and Fort William—viz. a red hot bar of iron to be put into a bucket of common tar and moved through the Barracks, once a day, so as to fill the rooms with the wholesome vapour of that substance."

atuses in fixed European Hospitals. The great advantage of these stoves is, that they afford the medical officer the means of prescribing either a roasted, baked, fried, grilled, or boiled diet. The judicious writer in the Medico Chirurgical Review, whom we have so frequently quoted, insists that an Hospital, even on the largest scale, should only have one kitchen, so situated that the diets can be easily carried to every ward, and in the shortest possible time to all. In the Bengal Standard Plan there is a Cook Room to each wing of the Hospital, but we think that it might generally be arranged, in this country, that one thoroughly well adapted building, centrically placed, would suffice; the diets being carried, to the Hospitals in doolies,—i. e. covered trays, with handles, carried by two men.

Lock Hospitals and the Prevention of Syphilis in the Anglo-European Army. To enter fairly upon this subject, we must first show to what extent the evil, with which we have to contend, is prevalent among our European Troops.

	Annual Admissions to Strength per 1000.	Annual Deaths to Strength per 1000.	Annual Invalided to Strength per 1000.
Bengal Army:—* Average of 6 years, 1850-51, 55-56. ...	174	0·30	0·80
Madras Army:—20 years, 1829-38 and 1842-51-52. ...	224	6·0	0.73
Bombay First Fusileers:—8 years 1846-53.	250	0·54	1·80 †

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* These statistics have been obtained, for *Bengal*, from the records of the Principal Inspector General's Office; for *Madras*, from Mr. Waring's paper, in vol. 3 of the *Indian Annals*, already cited; and, for *Bombay*, from Dr. Arnott's Report on the Health of the 1st Bombay Fusiliers.

† In an interesting letter, which I received in February 1859 from Dr. T. M. Lownds, of the Bombay Medical Establishment, my attention was first called to the fact that the number of men invalided for disease, of syphitilic origin, in the three Presidencies is, most probably, under-rated in our Returns.

Dr. Lownds notices that the numbers invalided in the three Presidencies, for *Debility, Broken down Constitutions, Rheumatism and Syphilis* are as under.—

	Bengal.	*Madras.*	*Bombay Fusiliers. (Arthur)*	
Debility, &c., ...	146·6	155·7	120·6	per 1000 of Invalided.
Rheumatism, ...	142·7	193·7		
Venereal Affections,	23·4	35·2	112·0	

The difference in these numbers is so very great that it confirmed an opinion which had forced itself upon his mind, during the time he

In a table, furnished by Sir A. Tulloch in the Report of Mr. Herbert's Commission, for the period subsequent to 1837, the rates of admission, per 1000 of mean strength, of H. M. British Army, are given as follow.

Bengal.	*Madras.*	*Bombay.*
29	315	262

It is not easy to explain these differences, except upon the ground of the data not being for corresponding periods, nor equally for the whole of each army.

According to Mr. Spencer Wells, in an average of 14 years, prior to 1856, 76 men in 1000, of the British army, were found to be suffering from this disease; but, since that time, the proportion had increased to 126 per 1000.

Hence, it appears that Syphilis is excessively prevalent among our European troops in India,—except that, according to Sir A. Tulloch's table, the Soldiers of H. M. British army, in the Bengal Presidency are, comparatively, very free from it. In Madras and Bombay, both sets of statistics show an excessive prevalence of the disease, in comparison with Bengal. All observation combines to show that, while Syphilis generally assumes a mild character in Bengal, the disease is extraordinarily rife and virulent along the whole Western, or Malabar Coast of India, which includes large portions of the Madras and Bombay Presidencies.

Preventative Measures. In former times, the leaders of armies resorted to measures of extreme severity, with a view to keep their camps free from Prostitutes*.

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had charge of European Troops, that Syphilis is, in a very large proportion of cases, the cause of Rheumatism, (or what is called Rheumatism,) and that a more correct nomenclature, for such cases, would be, "Syphilis or Syphilitic Rheumatism." Frequent conversations with medical officers in charge of Queen's Troops, on this subject, have confirmed him in the supposition that Rheumatism is charged with cases which should, more correctly, come under some Syphilitic heading. I have, since, seen the same opinion maintained by more than one medical officer in this Presidency.

* In a work, *De Studio Militari*, by Nickolas Upton, who was a canon of Sailsbury in the reign of Henry VI, and in the Chapter *de meretricibus ejiciendis*, it is ordered that no woman, of this description, shall be suffered to dwell within the precincts of any camp, leaguer, or fortalice, but shall remain, at least, a distance of a league from the same, on pain of breaking the left arm if, after one warning, she be found in the aforesaid prohibited place. By an ordinance, printed at Edinburgh, in 1643, runaway wives, apprehended following the camp, were to be put to death,

Towards the end of the last century, it was the practice, in some English regiments, to inflict the fine of a crown upon each soldier who contracted the disease, which the Surgeon got for his trouble. In the Navy, each man paid fifteen shillings for his cure. This also went to the Surgeon.*

According to the Bengal Regulations of 1812, the Hospital stoppage from the non-commissioned officers and privates of European Corps, was sonat Rs. 3 per month for common, and 4 for Venereal disorders. The last clause of this rule does not appear in a subsequent edition of the Regulations—1820 [?]

The system of Weekly Inspections,—which was commenced upon with equal loathing by the medical officers and the soldiers, but with a not unreasonable prospect of greatly diminishing the prevalence of disease,—has not answered the expectations which were formed of it.†

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the unmarried were to be branded by the hangman, and scourged out of the camp. According to Marshall; by the "Lawes and Ordinances Militarie," of Robert Earl of Leicester, 1579, vagrant women were to be whipped. In the French army, ladies of easy virtue, caught in the Barracks, were made to ride the *cheval de bois.* On this subject, vide also Ballingall, page 418.

* Hamilton. This bad arrangement continued in the latter service until about 1795, when Dr. Thomas Trotter, who had long protested against it, represented the matter, through Lord Howe, to the Lords Commissioners of the Admiralty, upon which it was put a stop to. Dr. Trotter shows that, when the men became infected, they did not hesitate to adopt any means likely to secure them from detection. In some of the Ships, were men who undertook to cure the disease in all its stages, generally by Calomel. Some consulted itinerant quacks, who flocked to the sea-ports, and paid largely for their advice, under which simple local complaints became seriously aggravated; others witheld the knowledge of their condition from the surgeon until the most painful and dangerous symptoms forced them to seek relief in Hospital. He concludes with the remark,—"Thus terminated a perquisite, illiberal from its institution, inhuman in its practice, and impolitic from its continuance. It forms an epoch in naval improvements; for *hundreds of seamen have annually fallen victims to its effects*"

† In his evidence before the Sanitary Commission, Mr. Dartnell expresses the opinion of every medical officer. "*It is a most odious and disgusting operation,*" "*and I do not believe that it is effective.*" "It is very repugnant to their feelings." "My idea is that any man, almost, who chooses, may conceal his complaint in the early stage, even with the most careful inspection. By adopting this plan"—(it was directed that every man, the moment he found himself affected with the most trifling Venereal Complaint, should report himself at the hospital. On his discharge from hospital, any soldier, who, the surgeon was satisfied, had had the disease three days before application, was reported to the commanding officer, and sharply punished for disobedience of orders and concealment of his disease)—"I did not inspect the men for Venereal Disease at all. I found that I had no necessity for it. Upon making the inspection for the

In this country, the Government, long since, adopted a measure which, had it been properly carried out, would, probably, have become a most effective means of prevention. In 1797, it was announced that the Governor General in Council had "concurred in the propriety of building *Hospitals for Diseased Women*, at the stations of Dinapore, Berhampore, Cawnpoor and Futtyghur, and the measure was to be carried into immediate effect. A proper hospital to be built in some convenient part of the Bazar, surrounded with a mud wall. Proper servants and victuals for the women to be allowed, at the public expense, as hereafter detailed." In subsequent years, similar Lock Hospitals were established at Barrackpore, Chinsura, Ghazeepore, Muttra, Agra, Meerut, Allahabad &c. &c. One of these Hospitals was also generally ordered to be attached to any large expeditionary force. Each was placed under the charge of a Medical Officer, with a permanent Establishment.

"*Establishment and Allowances.*"

To the Medical Staff in charge—Sonat Rupees	50 0
A Native Doctor	15 0
A Female Assistant to ditto	5 0
A Bheesty (water carrier)	4 8
Two Mehtraneys (women sweepers) 3 each	6 0

"With an allowance of three Annas Sonat, per day, for each patient,"—(by an order of 1807, the very large sum of nine sonat rupees, per month, was allowed for each patient)—"for which the Medical Staff, in charge, will provide them with charpoys and small settrengees by way of bedding, together with all suitable and necessary diet, and all country medicines that may be requisite." Europe medicines were to be procured from the Public Stores. Officers commanding garrisons, stations and corps were directed to order such inspections of the public women as might, in their opinion, best tend to the discovery of all who might be diseased; and all such were, forthwith, to be sent, under restraint, to the Hospital with a certificate, specifying date and name of each, to be furnished by the Provost Serjeant, or the Cutwal. No woman was, on any account, to leave the Hospital without a discharge certificate, from the medical staff in charge, which

general health, I always said to the men—'I look to your honour to come forward if any man has the Venereal Complaint'—and they, invariably, did so. I found it to work extremely well."

was to be delivered to the Provost Serjeant or Cutwal, by whom it was preserved. The dates of admission and of discharge, and the name of each patient were entered in a Register, kept by the Medical Officer, which was inspected, monthly, by the Superintending Surgeon. An European or Native guard was furnished for each Hospital. The rules, prescribed for cleanliness and the interior economy of Hospitals generally, were considered to extend, as far as they might be applicable, to these Hospitals; and the Superintending Surgeons included in their reports, to the Medical Board and Head Quarters, their condition, order and management, with an abstract of the number admitted, cured, and discharged, dead or deserted. Commanding officers were enjoined to take measures for having expelled, from intercourse with the troops, any women detected in endeavouring, when diseased, to elude enquiry, or not availing themselves of the humane consideration and relief which were, thus, extended towards their unfortunate condition by Government.*

Some thirty years subsequent to their establishment, these institutions had fallen into disrepute. Dr. Arnott says,—"An outcry was raised against them, on account of their supposed demoralizing character, and some even argued that, instead of removing, they increased the evil." "Many of the Lock Hospitals were not well conducted, and the Lall Bazars badly attended to." "The petty officials connected with them, certainly, took advantage of their position, and were often guilty of gross interference and imposition." Accordingly, in 1830, upon being consulted by Government with regard to the advisability of establishing a Lock Hospital at Mhow, the Bengal Medical Board gave it as their

* This order appears to have been, occasionally, carried out with more promptness than judgment. Sir G. Ballingall mentions that, while serving with the 2nd battalion of the Royals in India, the regiment being overrun by the Venereal Disease, and upwards of sixty men off duty from this cause, the commanding officer, without any previous warning, sent a parole round the barracks, in the middle of the night, to take up every unmarried woman who should be found there. These were all confined in the conjee house, or black hole, until the following morning, when they were inspected by the native doctors attached to the regiment. Such of them as were found free from disease were furnished with written passports, giving them free access to the barracks at all times;—(an amount of licence which it is difficult even to imagine, in the present day,)—those who were found diseased were drummed out of the Fort, after having their heads shaved and whitewashed, a mark of disgrace which was, for the time, indelible, and was a sufficient beacon to cause them to be shunned —Page 419.

opinion "that the good derived from the Establishment of Lock Hospitals at any station of the army, within the limits of the Bengal Presidency, was extremely problematical; and, judging by their own personal observation, these institutions had not accomplished the ends intended." The Governor General, in Council, agreed with the Board in the opinion that "the maintenance of Lock Hospitals, generally, was not productive of advantages in any degree commensurate with their expense; but, before adopting any final measure regarding those establishments, the Government requested to be informed whether there were any stations at which the Board conceived, from any peculiar circumstances within their knowledge, the Lock Hospitals should be exempt from abolition." To which question the Board replied that, "after bestowing the fullest consideration on the question, they did not think there existed a single station possessing peculiarities, as regarded these establishments, which should exempt it from abolition."

Accordingly, the Lock Hospitals of Bengal were abolished in General Orders of the Governor General in Council of the 9th July, 1830.* They were not done away with in Madras and Bombay until 1835.

Now that the question of re-instituting Lock Hospitals, in India, is much under discussion, I have thought it worth while to trace out, as accurately as possible, their history and the causes which brought about their abolition.

There were, then, many medical officers of ability and experience who regretted the abandonment of this system. In his Quarterly Report, dated December 1838,† Deputy Inspector General, Dr. Murray, of Madras, called attention to the increase of Venereal Affections among the European Troops on that command. The returns of the quarter showed the following proportions of infected to sick at the different stations: At Fort St. George, 1 in 6; at Bellary 1 in $7\frac{1}{2}$; at Bangalore 1 in 8; Trinchinopoly 1 in $8\frac{1}{2}$; Secunderabad 1 in $12\frac{1}{4}$; Moulmein 1 in $12\frac{1}{3}$; Cannanore 1 in $17\frac{1}{3}$; Poonamallee 1 in $18\frac{1}{2}$; and at Belgaum 1 in $25\frac{1}{4}$. Dr. Murray had, previously, handed in, to the Commander-in-Chief, documentary evidence of the great increase of this class of

* "The Governor General, in Council, directs, at the suggestion of the Medical Board, that all Lock Hospitals, under this Presidency, be abolished, on receipt of these orders at stations respectively."

† Madras Quarterly Medical Journal, vol. 1, page 442.

diseases, since the abolition of Lock Hospitals in 1835, and had recommended their re-establishment, on improved principles, at European Stations. The Governor General, however, declined to sanction the re-establishment, in any form, of the Lock Hospital system, "satisfied as his Lordship was, from the able report of the late Inspector General Dr. Burke,* that such hospitals were useless, as a means of checking the progress of Venereal Disease in European Regiments."

"I would ask," wrote Dr. Murray, "what, then, is to done for the prevention of this increasing evil among H. M.'s Troops in this command."

"If Dr. Burke's recommendation to abolish Lock Hospitals was with a view to effect this, it has signally failed, as our Returns show. It cannot be doubted that the source of the evil is in the diseased females being allowed almost unrestrained intercourse with the soldiers, and it is contrary to reason to imagine that *a well conducted* Bazar Hospital could increase the spread of the disease; or that, by curing it, its poison and ravages can be increased. The fact is, that the mode by which females used to be brought under examination was revolting to the habits and prejudices of the Native community, and was also taken advantage of by the Police Peons to serve mercenary and spiteful purposes; and it was mainly owing to impropriety and mismanagement in the former system that the Lock Hospitals were so partially successful. Now, certainly, the health and efficiency of the Queen's soldiery are greatly sacrificed for want of good Medical Police and Hospitals for curing diseased females, who might be treated in the Garrison Hospitals. At the present time, neither the Police nor Commanding Officers have any power to take up infected women and banish them from the neighbourhood of the Cantonment, and the soldiers cannot be prevented from having intercourse with them while they roam about at large, nor can they be punished for contracting the disease."

In 1836, Surgeon F. Sievwright, of H. M. 45th Regiment, remarked†—"The evil arising from the abolition of Lock Hospitals (by order of Lord William Bentinck) is a very serious and growing one. The diseases of this class abound in the contaminated bazars and suburbs of every military station where, without Lock Hospitals, they will continue to increase and

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* Which I have been unable to trace.

† Madras Quarterly Medical Journal, vol. 1, page 144.

multiply, and undermine the efficiency of the European soldiery."

So also, in the Memoir already cited, Dr. Clark, of the 13th Dragoons, shows that, in this corps, except during four famine years, the admissions for Syphilis, in 15 years, ranged from 16 to 110, only in one year reaching 140,—the admissions for these diseases, at Bangalore, during the three years 1837-39, which followed the abolition of the Lock Hospitals, were 200, 163, and 169.—He remarks that Lock Hospitals were done away with—"upon the supposed idea of Venereal Disease existing to a greater extent where they existed. We say *supposed* idea, because very extraordinary, very unlooked for, and very questionable. Dr. Mouat has shown, in a most clear manner, the fallacy of the reasoning which led to their abolition, in a private letter to Dr. Macleod, in reference to one on the subject by the late lamented Dr. Burke, of Calcutta. Even should the tables and the reasoning from them be correct, a most important fact was overlooked,—*the greater virulence* of the disease at those stations where no asylums were afforded to these miserable outcasts of society."

Sixteen years later, Superintending Surgeon Arnott, of Bombay, remarked that, "Even under the worst management, it would be difficult to explain how they" (the Lock Hospitals) "could increase the evil.* Under better regulations, irregularities might be avoided. The question of morality is one on which there will always be a difference of opinion; but, in its consideration, it must be borne in mind that Government does not encourage marriage, and only allows 12 per cent. married men in each regiment, and that this is the root of the evil. The point to be considered is, whether it is better to preserve the soldier's health and efficiency, and to save the country from the loss of his services under well-conducted and efficient establishments, or let him be exposed to the effects of sun and climate in seeking a gratification which entails disease and renders him useless to the State for months together. As Government has intimated its inability to correct the evil, I presume no assistance is to be expected from that quarter, but I know no better purpose to which the ample canteen funds could be applied. From these funds, under proper management, arrangements (which it is unnecessary to specify in detail), might be carried out, which would ensure protection from disease, and the preservation of the health of the men generally."

* We think this may be understood.

Last year, in reporting that a Lock Hospital was about to be established in connection with the Civil Hospital at Lucknow, Inspector General Dr. Campbell Mackinnon remarked that it would be well if one were established in every city where European Troops are cantoned.

In his paper on the Vital Statistics of the Madras army, Dr. Waring has given a table which, he justly remarks, speaks forcibly in favor of Lock Hospitals, as showing that the prevalence of disease increased after their abolition; thus,—

Years.	*Percentage of Admissions for Venereal Disease to Strength.*
1829	11·6.
1830	10·6.
1831	11·8.
1832	14·0.
1833 year of Famine, ...	26·8.
1834 year of Famine, ...	32·2.
1835 *Lock Hospitals* abolished,	28·4.
1836	26·1.
1837	24·2.
1838	26·8.
1842	20·5.
1843	17·5.
1844	16·0.
1845	19·6.
1846	20·9.
1847	29·7.
1848	35·9.
1849	32·7.
1850	28·1.
1851	27·1.

In a paper read before the Royal Medical and Chirurgical Society, in February last,* Mr. Acton described the manner in which Syphilis appears to be in progress of eradication from the Belgian army. A weekly examination is made to discover if disease exists among the men. If found affected, the patients are, at once, sent to Hospital. The authorities next enquire the name of the woman supposed to have infected the soldier, as well as the house where the disease was contracted; and the particulars are forwarded, without delay, to the Inspector of Health who, at once, examines the girl.

* Medical Times and Gazette, February 25, 1860.

If found diseased, she is, at once, sent to the Public Hospital and confined there till cured. These stringent measures are not only ordered, but strictly and effectually carried out. The result has been found so beneficial that, at the time the author visited the Hospital, *only eleven men out of a garrison* of 3,500 *soldiers* were laid up; six of these affections were merely slight cases of Gonorrhœa. To show that this was not an accidental immunity, a table was given of the whole of the diseases under which the Brussels troops suffered, during 1859, and the following remarkable deductions were drawn :—First, the extraordinary rarity of Venereal Disease, one out of ten [?] men only suffering from the affection; and, secondly, the singular mildness of the complaint. The almost total exemption from Syphilis is a no less remarkable phenomenon. Only sixty-two cases of Chancre occured during the 12 months in the garrison; in other words, one only in 56 men fell ill during that period. Secondary symptoms were almost unknown, as only 10 men came into Hospital with this serious complaint. These laws are also shown to have led to a great diminution in the prevalence of Syphilis among the civil population of Brussels, and to have put a stop to all indecency in the public thoroughfares of that city—Mr. Acton shows that, could we eradicate this disease, we should, at once, remove half the complaints under which our Foot Guards suffer. In London, every fourth man suffers from Syphilis (primary) instead of every fifty-sixth, as in Brussels. Constitutional Syphilis is so common and severe, in the Guards, that one in eight men who suffer from Chancre comes into Hospital on account of Secondary Symptoms. Dr. Balfour remarked that, from statistics extending over ten years, from 1837 to 1847, the number of cases among the Guards, compared with the Line, was 9 to 15; so that Mr. Acton had understated rather than overstated the case of the British army, as contrasted with the Belgian.

The Return of the Principal Inspector General of the Bengal Medical Department, to the Commander-in-Chief, for the month of August 1860, (which, however, is by no means a complete document), shows that 1734 men,—say two regiments,—out of a strength of 40,731, or 51 per 1000, were treated for Venereal Affections, in our European Hospitals, during the month.

This evil is, assuredly, one of great magnitude, demanding a remedy which, to be effectual, must be prompt, and which cannot await the distant, if possible, realisation of any Utopian

scheme for the improvement of the moral and physical condition of our army. None can feel more strongly than we do that the health, happiness and respectability of the European soldier, in India, would be vastly enhanced by surrounding him with the comforts of a decent home. It must, however, be borne in mind that, to enable every European soldier in the three Presidencies to marry, (placing aside, if possible, the strong military objections to such an arrangement,) the Government must be prepared to rebuild every European Barrack in the country, the new buildings being upon an entirely different plan from the old, and of double dimensions. New Hospital accommodation must be prepared, for the Women and Children, upon a most extensive scale. Passage from England must be provided for the Women. Conveyance must be found for them when they proceed Up-Country and upon occasions of relief. The expense of bringing down and finding ship transport for Invalids and Time-Expired Men and Regiments ordered Home will be nearly doubled. Schools for, at the very least, 150,000 Children must be provided in the Hills. The Women must receive the usual subsistence allowance. We do not think that all this is possible, in the present condition of our Indian finances, or in their visible future. Still, supposing each of the above arrangements to have been effected, we should still have to deal with the difficult questions,—would substantial good result from multiplying, in our cantonments, such people as the class of barrack women are at present? Are the education and the social position of our European soldier such, or can they be rendered such, that any class of European women, above the poorest and least educated, will be ready to share his lot in a country like India? How shall we prevent the enormous physical and moral evils arising from herding the women and children together in depots, whenever the army takes the field? How will the army be protected against Syphilis when on Field Service?

Still further, could all these mighty difficulties be satisfactorily disposed of, it would remain to enquire,—How is this army of respectable and fairly educated women to be profitably employed? What is to be done for the Widows,—(for it must be remembered that, at present, the Widows of soldiers draw subsistence money only for six months after their husbands' demise,—unless they return to Europe or re-marry soldiers.) Would the race be maintained? and, if it could, how would the soldiers' descendants find employment? To become soldiers and soldiers' wives, and enterprizing colonists on the slopes of the Ghauts and of the Himalayas, they

must be a robust, vigorous, intelligent race, capable of maintaining our wealth and our empire equally by commercial industry and by force of arms. It is more than doubtful whether the race could be perpetuated at all; but, if it could, would not these children and their descendants,—virtually orphaned from their early youth, reared, as exotics, upon the summits of isolated mountains, apart from the whole traffic, bustle, trial, struggle, society, and novelty of the great world in which, from the cradle to the grave, the minds of the rest of mankind are daily educated,—become a puny spiritless race, scarcely capable of self-support and, therefore, miserable in themselves and burthensome to the state?

We look for a present remedy of the great evil under discussion in a thoroughly well organised system of Lock Hospitals.

On referring to the list of Establishment allowed for the old Lock Hospitals, it must be apparent to every one, of Indian experience, that a place of this kind,—which merely received a daily visit from the overworked Civil, Staff, or Garrison Surgeon, or Medical Storekeeper of a large station, or from some young Assistant Surgeon who could, most conveniently, discharge its duties, and which, otherwise, remained entirely under the control of a Native Doctor and a Female Assistant, both people of the lowest class, and upon the very lowest allowances,—could not but become a means of, at the very least, extortion and oppression. It is only surprising that such a system could, possibly, have been maintained for forty years in every large military station throughout India.

It would, however, not be difficult to organise, upon the old basis, a system which would be, at once, humane and efficient. In a letter, addressed to the Superintending Surgeons of Agra and Lahore, in reply to their expressions of a wish to establish Lock Hospitals at their Head Quarters stations, Dr. Forsyth, Director General of the Medical Department, remarked that, in his opinion, the whole history of Lock Hospitals, in this country, distinctly proves that such establishments, if conducted upon the old system, must, almost inevitably, be failures; as, with the exception of the European Medical Officer in charge, the whole system was carried on by Native agency. The custom which, he believed, formerly existed to a greater extent than it does at present,—of placing the women of the Regimental Bazar, under the supervision of the QuarterMaster, under the inspection of one of the Medical Officers of the Regiment, and those of the Sudder Bazar under the

surveillance of the Cantonment Magistrate,—was found to keep the Bazars tolerably free from disease.

The only prospect of making a Lock Hospital really useful, is by conducting it with the vigilant and zealous co-operation of these two authorities; and, even then, little good can be expected unless a medical officer, of standing and activity, is placed at the head of the Establishment, assisted by an European Matron; and, to be p rfectly successful, even this scheme must have the hearty support of the whole of the Regimental and Medical Authorities on the spot.

Dr. Forsyth was fully impressed with the necessity of adopting some such decisive and comprehensive measure, as that sketched above, for the prevention of a disease which is known to undermine the health of so large a proportion of our European Force.

In the middle of 1859, the establishment of a Lock Hospital at Meean Meer was sanctioned, as an experimental measure, by H. E. the Commander-in-Chief; a vacated Native Infantry Hospital being set aside for the purpose.

The first annual report of this Institution by Mr. Ross, the Surgeon of the 3rd Bengal European Light Cavalry, shows that, in the Regimental Bazars of the Bengal Artillery, and Cavalry, women are licensed to remain under the sanction of the Quartermaster. They are inspected, weekly, at their regimental Hospitals, and the diseased are sent to the Lock Hospital, for treatment. Women are licensed to remain in the Sudder Bazar by the Cantonment Magistrate; and a strict supervision is exercised, that none are present except those whose names are registered. The examinations have been made by the Surgeon. Each woman is now subject to a fine of one rupee for every absence. More regularity of attendance has been the result.

There had been a daily average number of 65·4 prostitutes in the station, during the year, including both Regimental and Sudder Bazar. The daily average number of sick, in the Lock Hospital, during the year, was 8·2, and 135 patients, in all, had been treated—Each patient in Hospital received one anna and six pie daily, as subsistence allowance. Dr. Ross shows that the cost of the Institution, since its formation, has been Rs. 5-8-1 for each patient, which, he justly observes, is "not a large amount, considering the terrible evil the disease occasions among soldiers and the population generally, when allowed to remain uncured and unchecked."

The yearly average of admissions to strength, of soldiers, for the year immediately preceding the establishment of the Hospital, is shown to have been 2·56 per cent.

The yearly average of admissions to strength for the year ending 31st of May 1860, is 1·76 per cent, or a decrease in the number of cases of 8 per mille.

The Institution had not only produced the result of diminishing the number of cases, annually, but it was the general medical opinion that the disease had existed in a very mild form owing, probably, to the certainty of the weekly detection of disease.—There were, however, strong reasons to believe that many men became infected when on duty in the Citadel of Lahore.

Mr. Ross adds that, at Portsmouth, venereal wards are being built for the reception of diseased prostitutes, under the sanction of the Naval medical authorities, and that the establishment of Lock Hospitals in Garrison towns &c., is now under the consideration of the Home Government.

We need scarcely say that the adoption of a system for the prevention of Syphilis,—involving, as it necessarily must, the licensing of prostitutes,—has been objected to by many, among whom are some members of the medical profession, upon moral considerations. I cannot better represent the opinion of these conscientious objectors than by quoting the expressions used by Mr. Solly,—a man whose personal and professional character are equally deserving of the highest respect,—at the meeting of the Medico Chirurgical Society, upon the reading of Mr. Acton's paper already cited.

"Mr. Solly, so far from deeming Syphilis as an evil, regarded it as a blessing, acting, as it did, as a restraint upon the indulgence of evil passions Could the disease be exterminated, fornication would ride rampant throughout the land. He agreed with Mr. Wells, that the cure for the army, (and the same applied to society generally,) was to elevate the moral character."

When we meet with such arguments as these, and know that they come from men full of religious and compassionate feeling, we begin to comprehend the wide, if not enlightened, humanity of those who burned men to charcoal over slow fires, or tore them, limb from limb, by wild horses,—in the great causes of Conscience and Religion.

We regard with deference and respect the deliberate, conscientious scruples of every man who has deeply investigated and considered his subject; but,—absolutely impressed as we are with the conviction that *it is the first duty of the Physician to strive to prevent physical suffering, disease and*

death, whencesoever they arise,—the above argument has no weight whatever in our mind; and, when we find Mr. Solly adding, with a kind of pride, that, "in St. Thomas's Hospital" (which has long been fortunate in having him as one of its Surgeons) "there are 150 beds for syphilitic patients," we cannot but feel astonished at his inconsistency. That Syphilis is a penalty, imposed by God on vice, is certain: the same argument is, however, applicable, in a wider sense, to all physical disease,—"THE WAGES OF SIN IS DEATH." Still we are, in mercy, allowed to mitigate the severity of sin-imposed suffering; hence the existence of the humane profession of Medicine, founded upon the example of Him who went about healing the Sick. To be consistent, the maintainers of the argument which we oppose ought to deny the benefits of medicine to the sick prostitute and to the infected soldier. The wretch, smitten by Providence, should be driven forth to spread, broadcast, the curse and its terror; and, then, to perish, uncared for, in the streets,—an example of Divine wrath, hated and loathed by all.

We feel no shadow of a doubt or moral scruple in applying a well regulated prophylaxis to Syphilis,—while those who are wiser and more powerful than we are engaged in elevating the character of our soldiery and our populace above the instinctive frailty of humanity.

We believe that we have read, carefully, nearly all that has been written upon the subject, and the result is a conviction that a well arranged and conducted system for preventing Syphilis, will always tend, with certainty, to repress prostitution.

We cannot obtain any data to show whether the old Lock Hospital system, in India, exercised any such influence in deterring native women from flocking to our Military Bazars;—but the following extract from Mr. Ross' Report, given in his own words, is very suggestive of the good which is likely to follow the establishment of such a system.

"The attendance and examination were, at first, much objected to by the women; and, although this dislike has subsided, yet the custom has decreased the number of residents of that class,—*viz.*

"In the year ending 1st June 1859, there had been an average monthly strength of 66-5—No. 73 being present on that day."

"For the year ending 1st June 1860, there had been an average monthly strength of 47—and present, on that day, No. 32."

Officers' Hospitals.

The want of proper accommodation and attendance for sick Officers, in this country, has long and frequently been subject of remark. The experience of every medical officer must afford painful instances of the fact that, in many cases, the position of an officer, treated for severe sickness in his quarters, is often,—despite the kindest attention of his brother officers, nay, even of his own family,—less favorable for recovery than than that of his men in the regimental Hospital. The quarters occupied by the sick man, especially when he is young, inexperienced, or recently arrived in the country, are often small and hot, or are, otherwise, inconvenient and ill adapted for the reception of one seriously ill; or they are placed in an unhealthy locality, or at a considerable distance from the Medical Officer's quarters.—His own servants, especially when he is not acquainted with the vernacular of the country, very rarely pay him due attention; and are never, under any circumstances, trustworthy watchers by the bed of one who is extremely weak, insensible, delirious or wilfully disposed to disobey the injunctions of his medical attendant. Under these circumstances, especially in times of great sickness, when an intelligent medical subordinate cannot be spared to remain constantly in the house, the Medical Officer finds that most of the duties of a nurse devolve upon himself,—the consequence of which must, almost inevitably, be the neglect of other equally important duties, or the risk of his own health.

This very important question has been frequently mooted at Home.* The Military Hospital of each garrison town in France had, according to Mr. Boudriot, at the commencement of the present century, one or two pavilions destined to receive, exclusively, Officers of all ranks; who were, however, at liberty to cause themselves to be treated in their own quarters, and always at their own expense.

Twenty three years ago,† the Military Hospital at Brussels, as well as the other Military Hospitals of Belgium, contained private rooms, and an establishment of Baths for sick Officers, and the *"Sous Officiers"* were accommodated in wards, containing from three to six beds each, fitted up in nearly the same style as the rooms of the superior Officers. In some Hospitals, there was a private garden, for the use of the Officers.—At the same time, the Military Hospital, at Milan, had two rooms appropriated for the reception of sick Officers.

* Vide Sir G. Ballingall, page 90.

† Lancet 1837.

At Haslar, and I believe also at the Plymouth and Deal Naval Hospitals, there are small separate rooms, (or cabins as they are called,) for Commissioned Officers; and, in each, a comfortable ward set apart for junior Officers,—Midshipmen, Master's Assistants, Clerks &c.

We have seen that some very bad accommodation has been set apart for Officers in the General Hospital at Madras; and, at the Calcutta Presidency General Hospital, there are some side rooms, very deficient in proper conveniences, for Officers,—chiefly those of the Pilot Service. About thirty years ago, there was what was called a *Sanatarium* for sick Officers,—first in the town and, afterwards, removed into Fort William, where it was under the charge of the Garrison Surgeon. In the campaign of 1858, an Officers' Hospital was established, upon the judicious suggestion of the Medical Authorities of H. M. British Army, in Calcutta. One of the largest private houses in the town was engaged, completely furnished, and placed under the care of Staff Surgeon Dr. Thomas Ligertwood,—to whose great kindness and skill in its administration the Officers of both Armies owe a debt of the warmest gratitude.

A small well-constructed Hospital for Officers, in every large military station,—with a fixed establishment consisting of a trustworthy Medical Subordinate, an European Nurse, Compounder and Menial Servants, and with Baths neatly fitted up and accessible, at all times, to the Officers and European residents, upon the payment of a small sum to defray the expense of fuel and the pay of attendants,—would, undoubtedly, be the means of preventing much suffering and of preserving some valuable lives.

The questions of the Internal Management and Service of European Hospitals, in India, must be reserved for the next Chapter.

(To be continued.)

ERRATA AND CORRIGENDA.

Page 541, line 13 from foot for "were afterwards published, read was afterwards published.
Page 555, line 10 of Para 2, for history, read histories.
Page 565, line 2 for *coquaetterie*, read *coquetterie*.
Page 566, line 1 of Para 3, for as may, read as we may.
Page 569, line 7 for Polter, read Potter.
Page 573, line 7 of Note for arseinuretted, read arseniuretted.
Page 573, line 2 from foot of note for works if reparation, read works of reparation.
Page 577, last line of Note for 1853, read 1843.
Page 590, line 4 for brief a review, read brief review.
—— —— line 7 for acquianted, read acquainted.
Page 617, line 2 from foot of note dele "annually."
Page 625, fourth line from foot text for evil, read evils.

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